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NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

(ACRS)

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PLANT OPERATIONS AND FIRE PROTECTION SUBCOMMITTEE

+ + + + +

TUESDAY

JUNE 4, 2013

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ROCKVILLE, MARYLAND

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The Subcommittee met at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., Harold B. Ray, Chairman, presiding.

SUBCOMMITTEE MEMBERS:

HAROLD B. RAY, Chairman

MICHAEL T. RYAN, Member

GORDON R. SKILLMAN, Member

JOHN W. STETKAR, Member

NRC STAFF PRESENT:

GIRIJA SHUKLA, Designated Federal Official

DANIEL FRUMKIN

ROBERT HAAG, Region II

CHRIS JACKSON

ALEXANDER KLEIN

JOHN MONNINGER

CHARLES MOULTON

JUSTIN POOLE

ALSO PRESENT:

GORDON ARENT, TVA

CHARLES BRUSH, TVA

BOB BRYAN, TVA

BILL CROUCH, TVA

STEVE HILMES, TVA

RAY HRUBY, JR., TVA

FRANK KOONTZ, TVA

STEVE SMITH, TVA

JOHN STERCHI, TVA

T A B L E O F C O N T E N T S

P R O C E E D I N G S

(8:31 a.m.)

CHAIRMAN RAY: The meeting will now come to order. This is the meeting of the Advisory Committee on Reactor Safeguards, Subcommittee on Plant Operations and Fire Protection.

I'm Harold Ray, chairman of the Subcommittee. Subcommittee members in attendance are Dick Skillman, John Stetkar, Michael Ryan, and Girija Shukla is the designated federal official for this meeting.

This meeting will be open to public attendance. The Subcommittee will hear presentations from NRC staff and applicant Tennessee Valley Authority regarding the status of construction inspection and licensing activities related to Watts Bar Nuclear Plant Unit 2.

We have received no written comments or requests for time to make oral statements from members

of the public regarding today's meeting.

The Subcommittee will gather information, analyze relevant issues and facts and formulate proposed positions and actions as appropriate for deliberation by the full committee.

The rules for participation in today's meeting have been announced as part of a notice of this meeting previously published in the Federal Register.

A transcript of the meeting is being kept and will be made available as stated in the Federal Register Notice. Therefore, we request that participants in this meeting use the microphones located throughout the meeting room when addressing the Subcommittee.

Participants should first identify themselves and speak with sufficient clarity and volume so that they may be readily heard.

A telephone bridge line has also been established for the meeting. To preclude interruption of the meeting, the phone will be placed in listen-in mode during the presentations and committee discussions.

And we ask that everyone please silence your cell phones during the meeting. And with that, I will add a few additional comments to provide some context

here for us.

The review of the operating - Part 50 operating license application for Watts Bar Unit 2 has extended over what any would recognize to be a very long time.

And for that reason, we are going to have on our mind here a good deal more than what is showing on the agenda, because we've been asked to write an interim letter, the ACRS has.

And that's a significant challenge given the length of the record, that is, the temporal length of the record.

And we're going to have to consider things over the next month before the full committee meeting. In fact, well, prior to that so that we can identify what needs to be brought to the attention of the full committee in the July meeting as is presently scheduled, those topics of interest that span not just this meeting here or this in the immediately prior meeting, but all the meetings to date. So, that's one element that makes this meeting different than it might otherwise be.

The second thing is that we're accustomed, of course, to reviews which tend to fall into a couple of different patterns. One is a Part 52 application these days, either a design certification of COL.

Others are topical matters of interest.

I don't know when it's been that the Committee has reviewed a Part 50 operating license application, but it's been a very long time. And, therefore, that is an element that we need to try and keep into focus.

More significantly even than that, perhaps, is of course the fact that this is the second operating license for a dual-unit plant. And Unit 1 has been in operation now 17 years and that presents unique considerations as well.

The Commission in setting its ground rules for this proceeding that we're still in, issued a memorandum - or there was a staff memorandum in 2007 which laid out the ground rules for this unique proceeding.

And they seem on the face of it quite straightforward, but the implementation of course is more complicated when you get down to it and you start reading the SERs, for example. You realize that it's not as simple as it seems.

There were - whereas we're using the Unit 1 licensing basis as the basis for this review, there are provisions in the Commission direction for other considerations to be addressed, including things that

should be addressed now because they're - it's better that they be addressed today than after the plant has gone into operation and you have to go back and address the environment of an operating plant.

And, in fact, I note that TVA has indicated that at least one reason for media impact on the schedule that has occurred over the recent years has been - recently has been the effort to incorporate certain actions related to lessons learned from Fukushima.

So, these factors make what should be a straightforward and, one might say, almost a licensed renewal-type review, which we are accustomed to doing, a Part 50 license renewal, into something a good deal more complicated than that.

And it's also a fact, of course, that we are most concerned, perhaps, with the potential effect on Unit 1 of now becoming one of a dual-unit plant.

All dual-unit plants go through that whatever their history. This one just has a much bigger interval between the two units going into service so that the effect on Unit 1 of Unit 2 entering service becomes a matter for review.

So, all that being said, I just wanted to make the point that whereas the agenda we have here seems quite straightforward and incremental to what we've done

before, the reality is at this point in time as we face the need to write this interim letter that we've been asked to produce, our thoughts are going to be broader than just what is being brought to the table here today.

And I'm not sure that by the end of this meeting we're going to be able to define completely what's needed of the full committee. That may take some discussion on my part with the full committee this session here that is the rest of this week before I can have any confidence as to what things we might wish to be addressed before the full committee in July.

Okay. I think that's all I wanted to add to the standard statement that I'm obliged to make. I'm now going to turn to Mr. Poole of the NRR for some comments before the applicant begins.

MR. POOLE: Thank you, Chairman. Good morning. My name is Justin Poole. I'm a senior project manager in the Office of Nuclear Reactor Regulation, Division of Operator Reactor Licensing assigned to the Watts Bar Unit 2 operating license review.

CHAIRMAN RAY: So, you deal with all of those complications that I'm -

MR. POOLE: Yes, on a daily basis.

CHAIRMAN RAY: We can rely upon you to keep us straight. Go ahead.

MR. POOLE: So, as you said, the proposed agenda that we have for today was - the topics we intend to cover were as follows: TVA would start off going over their construction completion status, followed by closure of Open Item 132, boron dilution, and ending with a discussion on fire protection.

The staff would then come on and discuss its status of the licensing and construction inspection, a brief status on the remaining open items, and then move into the topics that I mentioned before with the closure - and the status review and closure of Open Item 132 on boron dilution, and the status review of the fire protection report submitted by TVA.

CHAIRMAN RAY: I think that just as a matter of calibration, of course you're going to make presentations as they're prepared, but we're going to be interested, but less interested in construction and inspection status than we are in open items and the broader issues that may be of interest.

MR. POOLE: Understood.

CHAIRMAN RAY: So, don't be surprised if we just receive the inspection, I mean, construction status reports and so on as updated information, but then want to discuss in more detail the other things you mentioned. Okay.

MR. POOLE: And then ending by discussing what remains for the staff review and upcoming ACRS meetings similar to what you just talked about with the full committee next month. And then future sub and full committees next year.

With that, I will turn it over to TVA.

CHAIRMAN RAY: Thank you. Mr. Hruby.

MR. HRUBY: Good morning. I'm Ray Hruby, general manager of technical services at Watts Bar Unit 2 for the completion project.

TVA appreciates this opportunity to provide the Advisory Committee on Reactor Safeguards the current status with the project and the actions we've taken on the way to completing the unit and obtaining the operating license for Watts Bar Unit 2.

For today's meeting, we'll be following the agenda provided on Slide 3. I'll provide an update of the project, status of Watts Bar Unit 2 construction completion. Bob Bryan to my far right, will discuss the SSER open items related to boron dilution events.

This open item was previously requested by this committee for presentation following the NRC staff review and approval. He'll then discuss site interface.

Bill Crouch to my immediate right, will

discuss the development and review of the fire protection report that was approved in Supplemental Safety Evaluation, SSER 26.

And then following these technical presentations, I will provide some brief closing remarks and then provide an opportunity for any other questions you might have.

So, this portion of the presentation will provide the current status of Watts Bar 2 completion project and I'll be discussing the following areas: First, I'll provide a brief overview of our efforts to re-baseline the project using an Estimate to Complete or an ETC process.

Next, I'll cover the current status of the project from a safety, quality, cost and schedule perspective and discuss some of our accomplishments to date.

I'll then turn it to the current licensing status of the project and describe the overall progress towards the operating license, provide an overview of the remaining schedule of activities associated with the operating license, and then discuss some of the remaining challenges we see ahead of us.

Finally, I'll talk briefly about the progress toward integrating, as you mentioned, the Unit

1 and Unit 2 for the complete Watts Bar site.

So, since the last presentation to the ACRS Subcommittee that was in December of 2011, a pretty comprehensive review was performed to determine the cost and schedule for completing Watts Bar Unit 2.

This review was completed in April of 2012. The conclusion resulted in a most likely completion date of December of 2015 with a range of between September and June of 2016.

As a result of the extension of the project completion, we needed to submit an extension to the construction permit that was submitted to the NRC staff on May 17th of 2012.

So, as a result of the work -

CHAIRMAN RAY: And the staff is not responding?

MR. ARENT: This is Gordon Arent. The staff has responded that they have accepted the proposed extension. However, they're waiting for the final environmental statement to complete. And when that completes here this month, then they'll move forward with the extension on the construction permit.

MEMBER SKILLMAN: If I may ask, please, what is - I'm Dick Skillman. What is the provision in that estimate for the Fukushima actions?

MR. HRUBY: Fukushima - proposed Fukushima actions were estimated as part of the Estimate to Complete.

So, we've allocated an amount of money to provide for the engineer features and other mitigating strategies for responding to the Fukushima event.

MEMBER SKILLMAN: Thank you, Ray.

MR. HRUBY: So, as a result of the work done to produce the ETC, Watts Bar Unit 2 project management is confident in our ability to finish this project by the committed-to date. And, again, that most likely date is December of 2015 for commercial operation.

This is not to suggest there are not risks and opportunities that remain. However, we believe that these are manageable.

The Watts Bar Unit 2 project performance continues to be consistent with the Estimate to Complete plan that was produced by the organization. Project performance remains on track for the most likely December 2015 completion date.

Safety performance continues to be excellent. We just surpassed a milestone of 20 million hours without a loss-time accident, which is a very good performance. Also, our recordable injury rate as of the end of April stood at 0.19, which is top decile

performance for construction.

We're also continuing to promote a strong safety-conscious work environment and encouraging people to raise concerns as early as possible so that the organization can address them in a timely manner.

Quality performance also remains very high. We measure our quality performance by the QC acceptance rate of the installations.

Our goal is 95 percent first-time QC acceptance. We're actually up to 97 percent. So, this is a very good quality performance. Also, our Nuclear Regulatory Commission inspection results indicate that our quality remains high.

As I said, schedule and cost performance continues to meet the expectations, and we are slightly ahead of schedule and also within our allocation for cost.

So, following the Estimate to Complete, the project first focused initially on bulk construction, that is, finishing the construction of the unit. Primarily, conduit and cable installations.

At this time, we're transitioning out of bulk construction and into system completion mode. As the project transitions from bulk construction personnel, we're augmenting work processes, oversight,

monitoring and other project functions in order to support system completion and testing.

Because we're accelerating several of our systems to completion, we want to begin testing as early as possible to find any potential issues as we test the units and the components and systems. The earlier we do that, the better.

It also helps to reduce the overall project risk by discovering things as early as possible in the testing process.

We have released our first system to system - to startup. That was Service Air. And that also was a system that we stamped under ASME Section 3 requirements.

MEMBER SKILLMAN: Ray, let me ask this. I reviewed the SSERs 23, 24, 25, 26 in preparation for today's meeting. The last time we met was on December number 15 of 2011. Prior to then, it was October 5.

What I was digging for and Harold kind of communicated that the members may be thinking this way, is the topic of shared systems.

And fortunately, in all of those editions of the SSER, the authority has broken out what is shared, but here's my real question: The CLB, Current Licensing Basis of Unit 1 is the basis for Unit 2.

And I know firsthand that if you try to buy a safety pump today in 2013, it's going to be a 2012, 2011 code edition machine when the equipment that it is parallel to, if you will, was installed 20 years ago to codes and standards that were 20 years ago.

What effort has the Authority made to ensure the correct code compliance particularly with shared safety systems so that the newer hardware is compliant with the appropriate code and your license under 10 CFR 50?

MR. CROUCH: For the shared systems, such things as the component cooling system, central raw cooling water, all of the major pumps, heat exchangers, et cetera, are all tuned over to Unit 1, even to Unit 2 components. They were turned over as part of Unit 1 original licensing. And so, all of that - all those components were maintained under the Current Unit 1 programs.

If issues come up with them for repair/replacement since that time, they've been maintained under the Unit 1 repair/replacement program for Section 11, which is currently 2001-2003 version.

For Unit 2 for the ASME Section 3 systems if we've had to buy something, we have - for the most part, we haven't had to buy. We've been able to

refurbish the pumps that were there or the valves that were there. We bought several new valves, but we've been able to do reconciliations, code reconciliations to show that they are acceptable from - to meet our 1971-73 ASME code of record.

MEMBER SKILLMAN: Thank you.

CHAIRMAN RAY: In that regard, let me just add it's not - it's just an additional comment that commission guidance did allow that the staff should encourage the licensee to adopt updated standards for Unit 2 where it would not significantly detract from design and operational consistency.

So, I know that's something you've tried to do as well, whatever it means. It seems like it's a reasonable provision, but it does allow you to do that.

MEMBER SKILLMAN: Yeah, let me weigh in one more time. I respect the process of reconciliation, because the code will let you do that as long as it has been in your chain of custody, which it has been.

MR. CROUCH: Yes.

MEMBER SKILLMAN: So, that is a very clear standard for the code that you have owned and hopefully protected that equipment that gives you that allowance under Section 3 to go ahead and -

MR. CROUCH: Yes, we are very conscious of

that fact. And, matter of fact, as some of you might be aware, our end certificate holder for completion of Unit 2 is Bechtel. It is not TVA. And so, if we buy any new equipment, Bechtel has to buy.

And since TVA is not a material supplier, we can't even use any of the material that TVA has. We can transfer components as long as it has full ASME paperwork, but you cannot transfer material from TVA to Bechtel. It has to be by NCA 3800 material supply.

So, we're very conscious of maintaining our code of record and strict compliance with it.

MEMBER SKILLMAN: Thank you.

CHAIRMAN RAY: Is the air system you just referred to shared?

MR. CROUCH: The particular portion that we've ASME stamped, it comes from a shared supply. But the portion that we've stamped is just simply the penetration through primary containment. It's a very small valve pipe - valve type of situation. So, it's part of the overall shared system, but the portion we stamped is not shared.

MR. HRUBY: And you also mentioned the interface between Unit 1 and Unit 2. Our top priority during the construction of Unit 2 is not to affect the safe operation of Unit 1.

We recognize that we have shared systems and we're particularly conscious of not affecting the safe operation of Unit 1.

I'll refer you to the next slide. This is our - I refer to project quality. As you can see from the graph, our quality has been consistently high and above goal.

And, again, this is really a testament or an indicator of positive work or training, as well as the level of involvement of QC workers during the conduct of day-to-day activities.

The primary measure of the project, construction quality is - the QC acceptance rate is measured by the percentage of work that's passed the QC inspection process during installation.

The next slide, the chart that's on the screen, and we provided a larger version for your reference because this is kind of hard to see on the screen, but it provides a pictorial representation of the current project status and major milestones through fuel loading and power ascension testing to commercial plant operations.

This is really a vigor Level 2 schedule. We have a very comprehensive Primavera P3 schedule that contains, I think, right now over 64,000 activities to

complete the unit.

As mentioned previously, bulk construction activities are primary associated with conduit and cable installations.

As Bill mentioned, the bulk of the mechanical equipment is already installed. So, we're connecting up the electrical components.

And in transition of the systems, that represents the systems where we've moved from bulk construction mode to system turnover.

We have targeted several systems required for what's known as open vessel testing. And there's eight systems associated with that. And we're actually accelerating those systems more quickly than what's indicated on the schedule.

And those systems include component cooling water, emergency rod cooling water, chemical and volume control system, safety injection, residual heat removal, containment spray and flood mode boration.

So, these are the systems that we're focused on now. We are continuing with the bulk construction of the rest of the plant, but we're really focused on turning these systems over so we can begin testing systems.

As far as the construction work control

process, what that reflects is the systems that have moved from bulk construction style or commodity planning and scheduling process to a system-based planning and scheduling process.

The result and the focus of completing all work associated with the specific system, we go over our schedule's critical path on a daily basis.

Each system, each component, each open item required to close the systems, those are discussed every day with the staff.

So, as we prepare to turn systems over, we begin the phase of performing final construction walkdowns, system turnovers for construction testing and the commencement of component testing.

And these have been completed for the one system we talked about, Service Air, as mentioned earlier.

MEMBER RYAN: Ray, what's your current work schedule? Are you working one shift, two shifts, 24/7?

MR. HRUBY: We're working for the bulk of the project since the ETC, we were working 4/10s. And we then went to two-shift operation, 4/10s.

Now, for the rest of this fiscal year and probably beyond, we're going to go to 5/10s for the manual craft and then continue on.

So, we're working not a full two-shift operation, but as needed. Typically on the back shift we'll do the cable pulling as a focus activity.

MEMBER RYAN: Thank you.

MR. HRUBY: You're welcome.

Okay. I'd like to talk about the licensing path forward now. With the issuance of the Supplemental Safety Evaluation Report SSER 26, the majority of the activities require an NRR staff review have been completed.

Approximately 10 SSER open items remain to be closed. Most of which are submittals related to the validation of the as-built plant conditions.

Additionally, a final Safety Analysis Report change reflecting the new probable maximum flood levels of the Watts Bar are currently under staff review.

And as Gordon mentioned, the Final Environmental Statement, FES, is expected to be issued in June.

With the exception of the work being performed by the staff on a new waste confidence rule which I'll talk about a little bit later, and an open contention before the Atomic Safety and Licensing Board, the Environmental Review for Watts Bar 2 in support of the operating license is complete.

We continue our work to close the remaining regulatory commitments and support regional inspections.

We currently have about 660 open commitments and we're working with the Region II staff to schedule these based on the schedule to complete the project.

The majority of the remaining commitments requires some level of system completion to support the closure. And as a result, a schedule and closure has been developed to support system turnover.

And we also share that with Region II staff so that they can see what our schedule looks like and plan their activities accordingly.

With the transition towards pre-operational and startup testing, we do anticipate a greater presence by the regional inspection team.

We've already begun this year to see an increase in activity at the site. We have supported three or more inspection teams onsite in a given week already and again we expect that to continue to the remainder of the project.

And as mentioned earlier, the contention remaining regards to health of the Tennessee River ecosystem based on the issuance of the FES. We

anticipate that here and before the ASLB will start in early 2014.

The next slide is a graphic that provides the integrated licensing schedule for Watts Bar Unit 2.

This is, again, a high-level Level 2 schedule. Each of the boxes and activities required for the activities shown on this graph are in our project schedule and integrated with the construction project.

The top swim lane, that's the blue one, is essentially the conventional licensing activities that are required to get the operating license for Watts Bar 2.

The second swim lane down, the green, as was mentioned, is the Fukushima actions that were taken. Those are both the orders and the 10 CFR 50.54 (f) responses.

The third swim lane down is in yellow. It represents the integration activities between the operating organization and Watts Bar Unit 2 to ensure the Nuclear Power Group, which is the operating entity for the TVA fleet of nuclear plants, is prepared to accept the second unit.

And then the final swim lane down, that's the brownish color, is provided to track the NRC's

schedule for waste confidence rulemaking.

So, currently all the activities that are shown on this support actually an early fuel load date of December 2014.

MEMBER SKILLMAN: Where are your operating people going to come from, Ray?

MR. HRUBY: The majority of the operating staff have already been hired. They have actually been working at Unit 1. They were hired in anticipation of the earlier completion of Watts Bar Unit 2.

So, the bulk of those people are there. We're continuing to hire more people and process them through the training programs to get either SROs, ROs or unit operators.

MEMBER SKILLMAN: Okay, thank you.

MR. HRUBY: You're welcome.

CHAIRMAN RAY: Let me just comment again for the record and the Subcommittee members, what you refer to here as the second swim lane down, the Fukushima-related action item for an existing plant like Watts Bar Unit 1, the implementation is straightforward. There are many plants affected in the process of proceeding as well established.

It's a little odd that that's taking place on Unit 2 as well as if Unit 2 was in the same status

as Unit 1.

I mean, that's what it - I can see that they're related here on your chart, but I guess maybe I should ask the staff when they come up, how they think about this as to whether or not we're thinking about implementing the Fukushima action items on Unit 2 as if it were Unit 1 or as we do any other plant that's in operation today, or if there's any different approach being taken.

Because they aren't, you know, it isn't addressed as part of the review of the operating license itself that we're engaged in. It's almost for information here. It's not part of what we're reviewing.

That's the reality at least as I see it. If I'm mistaken, I'll - you can tell me or the staff can tell me, but I think it's going on as if Unit 2 were an operating license plant.

MR. ARENT: That is correct. This is Gordon Arent.

CHAIRMAN RAY: Yes.

MR. ARENT: With respect to the Fukushima orders or, say, mitigating strategies for spent fuel pool instrumentation, we are on a track and we're actually called out in the orders to have that completed

prior to licensing of Watts Bar Unit 2. So, the order requirements are, in fact, moving forward in support of licensing.

For the 50.54(f) request for information letter, we are following the Watts Bar Unit 1 schedule for that and will be providing information consistent with that schedule.

CHAIRMAN RAY: Okay. So, you've got direction that says these things needed to be implemented before the operating license is issued.

MR. ARENT: That's correct.

MR. HRUBY: The order part.

MR. ARENT: The order -

CHAIRMAN RAY: Yeah.

MR. ARENT: And just for clarification because a question was asked about the funding for Fukushima, the project, the Unit 2 project actually is funding the entire Watts Bar site.

So, we're covering not just - we haven't just carved out Unit 2 and we're taking care of that. We're taking care of the entire Watts Bar Unit 1 and Unit 2 site in whole.

CHAIRMAN RAY: Okay. Well, that's interesting, but your point about the tie between completion of these items and the issuance of the

operating license, I guess, is what I was looking for.

But we're not including it in the review that we're conducting here, as I see it, anyway. Okay.

MR. HRUBY: Okay. The next slide continues on with the licensing path forward. And I'll touch on each of these. We consider these areas to be risk areas for the project.

The first is waste confidence. And the time it may take to reissue the role has a potential to impact the final licensing process for the project, but it's not expected to impact the project in the short term.

So, we're monitoring the generic rulemaking by the NRC and right now it looks like we're in good shape to meet the schedule.

As far as Fukushima, as Gordon talked about, the regulatory impacts of Fukushima are significant.

While the NRC continues to develop the final regulatory framework in response to Fukushima, Watts Bar is using the NRC's current Fukushima orders and the 10 CFR 50.54(f) request for information to prepare and submit documents ascribing the actions and modifications to be done to further protect against earthquakes, floods and the loss of power.

As far as hydrology, TVA has performed

extensive hydrology evaluations of the river system upstream of the Watts Bar and Sequoyah nuclear plants. A license amendment request for both sites has been developed and are currently under review by the NRC staff.

The aquatic contention I referred to earlier is related to the health of the ecosystem. It remains open for Watts Bar Unit 2.

With the planned issuance of the Final Environmental Statement in June, we anticipate the ASLB to establish the timetable to start hearings in early 2014 for the project.

And then whatever emergent regulation may come up, we are continuing to monitor for new regulations proposed by the staff that might have the potential to affect the completion of Watts Bar Unit 2.

Okay. TVA has created a Dual Unit Operations Readiness Team. Chris Church is the vice president of that organization. He's sitting to your left at the table.

The responsibility of this team is to facilitate the safe and smooth transition from construction to dual unit operation, including turnover and power ascension activities.

The group is also responsible for helping

to prepare for industry reviews and NRC inspections associated with the operational readiness. And some of these include the INPO readiness review that's conducted, and also the NRC Operational Readiness Assessment Team, or ORAT, inspections.

And, again, the mission is to safely conduct initial fuel load and operational testing necessary to achieve dual unit commercial operations.

Some of the responsibilities and functions of this organization is to essentially provide governance and coordination between the operating staff at Unit 1 and the construction organization at Watts Bar Unit 2.

They're in the process of preparing organizational transition plans providing operational readiness, self-assessment, oversight that the organization that Unit 1 is performing.

They ensure that every process, program and procedure has an owner and a schedule. And it does schedule support the completion of the project.

They're also coordinating and overseeing system and area turnover and coordinating the resolution of issues that might crop up between Unit 1 and Unit 2.

So, that concludes my portion of the

presentation and I'd like to open it up if you have any other further questions for me.

CHAIRMAN RAY: Anything else?

MEMBER SKILLMAN: Yeah, I do.

Back to your Slide 12, hydrology. Ray, would you explain a little more about the actions under hydrology? I'm thinking particularly about who controls the river.

MR. HRUBY: Well, TVA controls the river system.

MEMBER SKILLMAN: Okay. So, you're an SRO and you're at Bar and you see that water level coming up. Who do you call and say, open up for downstream, I want the water level to go down?

MR. ARENT: Steve, do you want to answer that for us?

MR. SMITH: Steve Smith of TVA. The river system operations personnel, we have a straight line to them from the control room for the shift manager SRO, SRO to call and request the water level - anticipated water level in the future and what it is now and what they can do to help us out, whatever we need.

MEMBER SKILLMAN: Has that ever been exercised in one of your operating plants?

MR. SMITH: Not from a flood perspective.

They need cooling water to support the ultimate heat sink and issues like that we have coordinated through them to increase flow through the dams on the river or whatever needed to be done to get the water temperature where we need it for ultimate heat sink.

MEMBER SKILLMAN: Thank you.

MR. SMITH: Yes, sir.

MEMBER SKILLMAN: Thank you, Ray.

CHAIRMAN RAY: Maybe it would be helpful just to mention, briefly, my recollection is - I don't know whether this is colloquial or intentional.

Watts Bar is a wet site and that you're prepared to establish shutdown conditions in anticipation of water levels rising higher than normal for plant operation; is that correct?

MR. ARENT: That's correct.

CHAIRMAN RAY: And as far as exercising that goes, you can tell me what you can say about, yet, we can do that and, now, we can do it.

MR. ARENT: Steve, do you want to talk to that again also? In other words, as far as doing the walk-throughs or the tabletops on flood mode operations -

CHAIRMAN RAY: Yes.

MR. ARENT: - what we've done with respect

to -

CHAIRMAN RAY: I'm sorry.

MR. ARENT: - exercising flood mode operations?

MR. SMITH: Yes, as part of the Licensed Operator Recall Program, we do have scenarios, classroom analytic simulators where we set up these conditions and do actual and submit simulated communications with the river systems ops to give us the indication that the conditions are likely for a flood and so that we can implement the flood mode procedures, that AOI-7 series to physically walk through and simulate performing those actions.

CHAIRMAN RAY: Okay. That was my recollection. I just wanted you to repeat that again.

MR. HRUBY: Okay. With that, I'll turn it over to Bob Bryan for boron dilution.

MR. BRYAN: Good morning. I'm Bob Bryan. I work on the Watts Bar Unit 2 licensing staff. When we were here on December of 2011, we talked about the design basis accidents and transients that are described in FSAR Chapter 15.

We had one open item which was boron dilution event in the shutdown modes of hot standby, hot shutdown and cold shutdown modes 3, 4 and 5.

This event is where unborated water is added to the reactor coolant system in an anticipated or unplanned manner.

There are a number of control - main control room indications that this event is going on, but there are three safety-related alarms.

One is the high flux at shutdown alarm, there's also a high charging flow alarm, and we have added an alarm on the volume control tank in the chemical volume and control system, which is the system that would provide the water in this event. So, they did alarms in the annunciator panel at a high level.

Next slide. We also in looking at this event, made a set of procedure changes. One is we added the appropriate annunciator alarm responses for the high volume control tank level indicating that a boron dilution event may be going on.

Another thing we did was we changed the operating instruction so that when the plant was in Mode 4 and you're at a reduced RCS pressure and have the potential to add more unborated water, we secure one of the two primary water pumps.

And then the last thing we did was, was when you take the last reactor coolant pump offline, you isolate all the dilution paths. And so, then the event

could no longer occur.

MEMBER SKILLMAN: Approximately how many dilution paths do you have to isolate, please?

MR. BRYAN: Well, there are a couple of ways to do it. You can isolate the primary water to the chemical volume and control system. You can isolate a path from the boric acid blender to the chemical volume and control system. And then you can also isolate the path from the chemical volume and control system to the RCS.

So, you've got several different ways of isolating it.

MEMBER SKILLMAN: Well, the first two that you mentioned are probably the highest probability.

MR. BRYAN: Well, yes. They're the only ways you can get -

MEMBER SKILLMAN: Okay. So, when you isolate those, do you isolate those with a padlock and a chain or with administrative control? How do you -

MR. BRYAN: There are control room switches to allow you to isolate them. So, the operators can do it from the main control panel.

MEMBER SKILLMAN: So, once that isolation has been affected, that is somehow toggled as do not operate?

MR. BRYAN: Steve.

MR. SMITH: Well, what we do are tech specs for the operating unit require dilution test to be isolated under admin controls.

And the way we implement those admin controls is under the clearance procedure. We actually hand the hold order tags, clearance tags on the equipment when it's isolate, have an independent verification of them being in place.

And it's not a padlock, but we do do a tags plus method which uses a wire tie top component to hold the component in place so some inadvertent bump cannot open up the valve.

MEMBER SKILLMAN: Thank you.

MR. SMITH: Yes, sir.

MR. BRYAN: Okay. For Unit 2, the action requirements we had were to show that we had at least 15 minutes from the time we received a safety grade alarm for the operator to take the necessary actions.

And in modes 3 and 4, we have more than 45 minutes after the alarm. And in mode 5, you have 23 minutes after you receive the safety grade alarm to isolate the dilution path or -

CHAIRMAN RAY: You were quite precise there correctly to say Unit 2. Why aren't we talking about

this now? Is Unit 1 so different? What's the -

MR. BRYAN: Unit 1 has a slightly different licensing basis. Their licensing basis was that they basically had to show that they had 15 minutes from the initiation of the event to terminate the dilution whereas we had to show we had 15 minutes after the alarm.

Takes about 15 minutes before you get the first alarm in. So, that's really the delta between the two units.

CHAIRMAN RAY: Well, okay, but usually this is kind of a way of exploring this matter I talked about earlier.

How did it get changed for Unit 2? What -

MR. BRYAN: Well, Unit 2 has -

CHAIRMAN RAY: You say the licensing basis is different for Unit 1, and yet it governs for Unit 2 with very specific exceptions.

Was this a specific exception?

MR. BRYAN: Yes, it was. Unit 2 had a statement in their FSAR that we would meet Revision 2 Reg Guide 170. And this was an explicit requirement in that revision of the reg guide.

CHAIRMAN RAY: Okay. I won't ask the next logical question why, but go ahead.

MR. BRYAN: That actually ends this part of the presentation unless you had questions.

(Laughter.)

CHAIRMAN RAY: No, I mean, I'm trying to establish what the constraints are for the full committee review, all right. And it's like, well, there are these constraints, except when they aren't. I'm talking about licensing basis now.

And that's kind of a - makes it more difficult when I'm dealing with the full committee to explain why it is that the constraints apply sometimes, but other times they don't seem to apply.

And if I could get a little more insight in this case to how this came to pass, because it's going to be an obvious question others will have as well, how is it that the requirements for Unit 2 differ from Unit 1 in this instance that this is the only case and you can't go and add a bunch of other differences that you want to add as well?

MR. BRYAN: Well, I don't think there is necessarily a good - I don't know that there is a really definitive answer to that.

There were - when you look at earlier revisions of that reg guide, some of the requirements for some of the analyses in Chapter 15 are slightly more

relaxed particularly on the transients than they are in Revision 2.

CHAIRMAN RAY: I mean, but why wouldn't people just say, well, of course there are lots of reg guides that have been updated. Why don't we just review the other two for -

MR. BRYAN: We actually had a statement in - early in Chapter 15 that said that Unit 2 would meet this revision of the reg guide.

CHAIRMAN RAY: So, you messed up, huh?

MR. BRYAN: Yes, we did.

CHAIRMAN RAY: I think there must be some other explanation, but I won't pursue it anymore. But it is, I mean, you understand my problem.

MR. BRYAN: Sure.

CHAIRMAN RAY: It seems like except where somebody wants to make an exception, there's no exception. But when they make an exception, then that's okay. And this seemed like an example of that, to me. I couldn't figure out how it happened.

In any case, given that it did happen and you've now done the analysis and the staff has accepted that the open item is satisfied; is that -

MR. BRYAN: That's correct.

MEMBER STETKAR: Bob, I have a question.

The analysis in particular during Mode 5 demonstrates a time of, as you've shown, 23 minutes. And so, I got curious and I backed out the volume increase in the VCT between normal level and the high level alarm.

And I'm guessing it's about 1,025 gallons based on your 75 GPM minimum letdown flow rate. And you use that 75 GPM during cold shutdown.

Most plants when you're in cold shutdown, line up letdown from the low pressure letdown line from the RHR system, not the normal letdown line. You can't get enough flow, because the orifices are in the normal letdown line.

If your letdown flow is less than 48 GPM, you have less than 15 minutes to get to the high level alarm.

So, my question is, what's your normal low-pressure letdown flow when you're on RHR?

MR. BRYAN: Frank, do you -

MR. SMITH: This is Steve Smith again. It is variable based on the cleanup rate and -

MEMBER STETKAR: Yes, it is. So, I'm going to ask you from Unit 1 experience since you've had several shutdowns, what's your average low-pressure letdown flow?

Because I know when we were operating the

plant, it wasn't very much. In fact, often it was zero.

MR. SMITH: Well, what we try to do is keep the letdown flow off RHR up to between a hundred and 125 gallons a minute normally to try to keep cleanup going.

MEMBER STETKAR: Do you keep it that high?

MR. SMITH: Yes, sir, if we can.

MEMBER STETKAR: Okay. I'd like confirmation of that, because that sounds pretty high. Because like I said if you're down below the ground number 50 GPM, it's actually 48, you're then under your 15-minute nominal time between from normal level to the high level, providing I backed out the right volumes at a 75 GPM letdown flow.

MR. SMITH: Okay.

MEMBER STETKAR: And that 75 GPM that you used was characterized as the minimum letdown flow, but you used that letdown flow during hot shutdown low power.

So, that's obviously your normal minimum power operation letdown flow through -

MR. SMITH: Normal power operation we had an orifice that's sized to do 75 gallons -

MEMBER STETKAR: Yes.

MR. SMITH: As you well know.

MEMBER STETKAR: Yes.

MR. SMITH: And when we go to RHR letdown, we try to maintain that 75 or higher -

MEMBER STETKAR: Okay.

MR. SMITH: - to clean up the reactor coolant system.

MEMBER STETKAR: I'd just appreciate confirmation of that.

MR. SMITH: Yes.

MEMBER STETKAR: Because that Mode 5 was your shortest time as shown on this slide here and I just wanted to make sure that we're covered under that operating alignment.

MR. ARENT: We'll get you that confirmation, sir.

MEMBER STETKAR: Okay, thank you.

CHAIRMAN RAY: John, did you want that confirmation in terms of what the procedure requires, or just what the -

MEMBER STETKAR: Just probably -

CHAIRMAN RAY: - normal practice is or -

MR. SMITH: Our general operating instruction for shutting down the plant delineates the letdown flow.

MEMBER STETKAR: Does it really?

MR. SMITH: Yes.

MEMBER STETKAR: So, yeah, that would be great. Because I know when we were - this was a previous lifetime eons ago, we kept a kind of variable depending on total RHR flow.

MR. SMITH: Chemistry has a big - a larger influx on how we do letdown flow than what -

MEMBER STETKAR: Yeah, yeah, thank you.

CHAIRMAN RAY: Okay. Anything else on the boron dilution?

(Pause in the proceedings.)

CHAIRMAN RAY: Okay, go ahead. What's next? I thought we were going to fire protection, but -

MR. BRYAN: Well, I wanted to - we added a presentation in here to talk a little bit about particularly the regulatory site interface and, I think, talk to some of the questions that you were raising in your introductory remarks a little bit.

CHAIRMAN RAY: Go ahead.

MR. BRYAN: From a site-wide standpoint, the noteworthy changes that we've had since we met last were on the hydrology and the flood level that Ray talked about.

As some of you may recall in our October 2011 meeting, we introduced some updated meteorology for the site. That has - the use of that updated

meteorology has been rolled into a number of the Unit 1 activities and procedures. They have updated their Offsite Dose Calculation Manual to use the more recent information.

We have also provided the staff a graph of the two unit offsite dose calculation manual. And then Unit 1 has made a licensed amendment on some of their Chapter 15 radiological accidents. And those too have included the updated meteorology that we were using on Unit 2. So, we're bringing the two units together on that.

As part of the tritium production on Unit 1, Unit 1 has added a tritiated water storage tank. This is a very large tank. 500,000 gallons.

It ties into the rad waste system, which is a common and shared system between the two units. It basically provides both units a lot more flexibility in managing offsite dose releases and will ultimately end up reducing our annual releases because we're able to store more, dilute more and hold up more. Those are the major site-wide changes.

MEMBER RYAN: Just a question. I mean, tritium is going to dilute in the hydrogen coolants. So, the quantity of tritium you're dealing with doesn't change. It's just a concentrated -

MR. BRYAN: No, and we're also allowed to - as part of the rad waste system, there are other nuclides that would be in the water that would change with the two units.

MEMBER RYAN: Okay. So, you have a rad waste treatment process that's also involved there?

MR. BRYAN: Yes, we have the - we have the normal plant rad waste system in the holdup tank - the existing holdup tanks that are inside the buildings with their capacity, but this is a new large tank that has been added. Actually, it's outside the plant, inside the protected area.

MEMBER RYAN: So, its sole function, I guess, I'm just trying to understand it. The sole function is that this tank contains tritium and water and mainly there's probably not much else in it and you're just managing flow into the release to the river?

MR. BRYAN: Yes.

MEMBER RYAN: You know, in the summer when the flow -- that sort of stuff, you're managing all those issues; is that right?

MR. BRYAN: That's correct.

MEMBER RYAN: Okay. All right. Thanks.

MEMBER SKILLMAN: Was this tank provided because of an anticipated steam generator tube rupture

or an anticipated -

MR. BRYAN: No, it was a tank that was paid for by the Department of Energy and associated with the tritium production that's done on Unit 1.

MEMBER SKILLMAN: I see. And so, now it can be shared with Unit 2?

MR. BRYAN: Yes, it can.

MEMBER SKILLMAN: So, it's a push-pull slush tank for whatever might be generated in either unit.

MR. BRYAN: That's correct.

MEMBER SKILLMAN: Thank you.

MR. BRYAN: We also have established an integrated Unit 1/Unit 2 regulatory interface. We have a single licensing project plan now for the site.

On that project plan, we list all of the - for Unit 1, it would be the license amendment request. For Unit 2, it's any of the significant technical specification changes that we would be looking at either for - required for Unit 2 operation or to facilitate doing it at operation, or in the case of Unit 1, ones they had planned that would affect Unit 1, but not Unit 2.

Would also include the regional inspection schedules on this - in this project plan, as well as any other regulatory submittals that either licensing

organization is planning, plus our meetings. And also all the open items and inspection items that we're addressing.

For the license submittals, we have - licensing submittals, we have an agreed-to priority on those between the two units. And we update this about twice a week and we have regular meetings on it to facilitate this interface so that we make sure we stay in a line and don't get cross-wise with each other.

MEMBER RYAN: How's it going?

MR. BRYAN: I'd say very well. A little rocky getting the priorities agreed to at the front end. But once we got past that, it's actually going quite well.

MEMBER SKILLMAN: Let me ask a question.

MR. BRYAN: Sure.

MEMBER SKILLMAN: Back on Slide 19, please. I was involved in the unit where we had seven different campaigns proceeding in parallel on one unit.

And when we took the time to line up all the actions for all of the campaigns, it became clear that it would be a Herculean task to really complete the work that we had identified.

Has some event or have some series of events caused you to have to create this integrated plan?

MR. BRYAN: There wasn't - I wouldn't say there was some physical event at the plant that caused that.

It was as we were looking at the transition from construction to an operating unit, one of the areas that was identified in our evaluations of that was that we needed to firm up and codify this regulatory interface between nuclear construction and the nuclear power group. So, that was sort of the genesis of doing this.

Also, I think we were also driven there as we were looking at there were a few specific submittals that we on Unit 2 were identifying as priority. And this was a good way to assure that we had fleet-wide focus and establish the priorities, make sure we understood what their high-priority issues were too.

MEMBER SKILLMAN: Who attends the meetings?

MR. BRYAN: Well, Gordon does as the licensing manager for Unit 2. Donna Guinn who is the site licensing manager for Watts Bar Unit 1. And also a manager out of corporate licensing organization.

MR. HRUBY: And to your point, it was because of the number of activities that both the units - that we felt compelled to integrate as much as possible to make sure.

And then, as Bob said, to get the fleet

involved because some of the activities may affect the Sequoyah, for instance.

MEMBER SKILLMAN: Thank you.

CHAIRMAN RAY: Excuse me. That just sort of causes me to want to reinforce what I commented on before just for your awareness of how we're having to struggle similarly so that our review doesn't extend further than it should, but it extends as far as it should.

In that commission direction that I mentioned six years ago, there was a statement for current generic safety issues at the resolution stage such as TSI 191 or security issues that will be much easier to resolve before plant operation. The staff and TVA should during the licensing period look for opportunities to resolve such issues where the unirradiated state of Watts Bar 2 makes the issue easier to resolve than Unit 1.

Applying that today you would say, well, clearly that includes Fukushima items. But as we are - but for the fact that the Fukushima items are being addressed like I was trying to describe earlier. And I'm trying to get that situated in my mind as to how the Fukushima items are outside of presently what we're reviewing, but they are tied into the issuance of the

operating license.

And I made that comment just so you'll know it's something we've been mulling over how we do our job looking at some generic items in this context that I just described, but perhaps not other generic guidance such as Fukushima.

MR. BRYAN: Well, I think - point noted. I think one other thing to note particularly as it relates to Fukushima items in the confirmatory order part of the - or the 50.54(f) part of the thing, you know, a lot of that stuff affects the entire site.

And so, the auxiliary building and the control building are all shared buildings. And so, there is a lot of the things that may fall out of that.

The treatment of those is that's a radiologically-controlled area currently. So, it's not exactly as - the line isn't as clear as it would be if it were like two side-by-side units that were -

CHAIRMAN RAY: That's right. It's not Palo Verde 1, 2 and 3.

MR. BRYAN: That's correct.

CHAIRMAN RAY: I understand that. And, like I say, starting with a dual-unit plant, I understand how closely coupled they are. It's just we're into an area here where we're having to parse very carefully

what -

MR. BRYAN: Sure.

CHAIRMAN RAY: - things we looked at and what things we didn't look at. Okay. Go ahead.

MR. BRYAN: Okay. Just to touch a little bit on some of the physical differences between Unit 1 and Unit 2, of course going in our goal was to try to minimize the physical differences and make it as easy as possible on the operating staff and the maintenance staff so to limit the number of differences they were having to look at.

Some of the major differences are of course we're not doing tritium production on Unit 2. Unit 2 still has the original steam generators, and we haven't done the feedwater flow uncertainty recovery on Unit 2. Those are differences that certainly affect somewhat what the operators see particularly in response to transients and accidents.

Next slide. Another one is, is we have had to do some amount of equipment replacement particularly in the electrical and I&C area due to obsolescence.

We have a different inadequate core cooling monitor on Unit 2. We have a fixed in-place core flux monitoring system. And we've done some digital upgrades on Unit 2 that do not exist on Unit 1.

To the extent we can in those digital upgrades, we've made the responses look as close to Unit 1 as we can, but there are differences in there.

We've also had to because of some of the digital features in Unit 2, we've had to look at cyber security at a different depth level than you would have to at Unit 1.

On the ECCS sump modifications specifically GSI 191, there are a couple of things that we have done on Unit 2 that have not - were not done on Unit 1.

We did reroute some cables and things so that we could completely prohibit the use of fibrous installations in areas where they could be affected by a pipe break and be transported to the sump. So, the only fiber we have in the plant is whatever the latent fiber in the dust and dirt is.

Another thing that we did was, was rather than going with combinations of orifices and valves in the ECCS system, we went in while the plant was clean and put in throttle valves so that we could have appropriate openings so that the sump strainer openings were the smallest opening in the path. And so, reduced the likelihood of being able to get a debris clog into the ECCS injection lines.

That's pretty much the main -

CHAIRMAN RAY: There was something about equipment qualification, I mean, environmental qualification requirements being different on Unit 2 or they're having unique EQ requirements.

Does that ring any bell with you? I haven't been able to find it here quickly and I just -

MR. HILMES: Steven Hilmes, Electrical I&C, TVA. I believe what you're referring to is there were a number of Category 2-type items that we upgraded to Cat 1. Primarily the main steam isolation valve solenoids, the main feedwater grates, the feedwater isolation valves - oh, and we had to - we actually had to qualify one of our - some flow probes to Category 1.

CHAIRMAN RAY: That's right. A little more information. You did those things because?

MR. HILMES: We did those things because the existing components were not available that we had on Unit 1. They have been modified. And under the 50.49 rules if you do replace them, you're supposed to upgrade to a Category 1-type qualification, full 50.49 qualification.

CHAIRMAN RAY: Okay. So, you'd have to do the same on Unit 1 if you were replacing -

MR. HILMES: Actually, when they end up

replacing those components, they will use the same components Unit 2-qualified.

CHAIRMAN RAY: Sure. Okay.

MR. BRYAN: Okay. That completes my discussion on this.

CHAIRMAN RAY: And we'll go to fire protection next?

MR. BRYAN: Yes.

CHAIRMAN RAY: All right. Then we'll take a break now until ten o'clock.

(Whereupon, the proceedings went off the record at 9:43 a.m., and went back on the record at 10:02 a.m.)

CHAIRMAN RAY: We're back on the record and ready to begin the discussion on fire protection. I want to observe in the beginning, this surely must set a record for the number of modifications by letter following a submittal. The list goes on and on and on and on and on.

So, I'm interested to hear more about it. I have read about it, and we're ready to hear what you have to present.

MR. CROUCH: Good morning. My name is Bill Crouch. I'm the lead mechanical nuclear engineer for Watts Bar Unit 2 with TVA.

I have several individuals here with me today that will help us answer questions should they arise. We have Steve Hilmes who is the electrical I&C lead. We have John Sterchi who is the fire marshal for the overall Watts Bar site. Steve Smith from the operations department. Brenda Simril who is the corporate fire protection project manager - program manager. And on the phone we have Charles Brush from EPM.

Charles, are you there?

MR. BRUSH: Yes, I am here.

MR. CROUCH: Okay. Charles is unable to travel with us today. He had had eye surgery, and so he is tying into us via phone.

Next slide. Just to give you a little bit of history of Watts Bar fire protection, the original Watts Bar fire protection report was submitted back in 1977. It was a Unit 1 and 2 fire protection report, because at this point in time the overall plans for Watts Bar was to be licensed as a two-unit plant.

The 1977 report was superseded by various submittals and finally Revision 0 of the fire protection report was issued on February 1992.

This report, however, basically even though it was called a Watts Bar Unit 1 fire protection report,

it addressed only single-unit operation.

The reason it's called a Unit 1 and 2 report is that part of the Unit 1 fire protection plan utilizes and relies upon some Unit 2 equipment. So, it's left as a designator of the Watts Bar Unit 1 and Unit 2 fire protection, but it's only for single-unit operation.

The NRC's review of this document was documented in Appendix foxtrot-foxtrot of the SSERs 18 and 19 in 1995. Unit 1 was licensed with the fire protection report at Revision 5 in 1995 and it has since been updated over the years from Revision 6 through 39 using the license condition 2 foxtrot which is consistent with the generic letter 8610 requirements for how you update a fire protection report.

As we started into the process for issuing the fire protection report for dual-unit operation, we had two basic commitments.

First of all, we wanted to submit what's referred to as the as-design fire protection report. This urging was submitted in 2010 and the original version was not a complete report. It only addressed the basic methodology-type sections and the comparisons to the NFPA code, et cetera, et cetera. It did not contain the actual fire protection analysis itself.

And that was part of the reason for so many

submittals is that we tried to provide the report incrementally to the staff to help facilitate their reviews as we went along.

During the course of the review, we did receive eight different sets of RAIs. Some of the RAIs were to provide additional information or clarifications.

We also were given various questions concerning technical and administrative errors. We did find that there was some historical errors in the Unit 1 fire protection report also.

And so, through the various review processes, we have gone through and corrected the technical errors.

In some cases, it was consistency issues between the front of the report versus the back of the report, et cetera. And so, we have done fairly extensive reviews trying to ensure the overall consistency of the report.

The final as-design version of the report was submitted in March of 2013. This is the as-design version report. This version is based upon the as-design information for cable routing, primarily.

Obviously, the mechanical equipment is already located in the plant, but we're still in the

process of pulling cables, that type of activity. And so, you cannot issue the final as-constructed report yet.

It is our intention right now to issue that final as-constructed report towards the end of 2014.

With the process of creating the dual-unit report, we wanted to address the original single-unit report to address dual-unit operation and also maintain consistency with Unit 1 commitments.

Unit 1 was committed to various regulatory documents. And so, we have tried to stay as consistent with those as we can.

We've also incorporated any planned Unit 1 upgrades. So, when we started the project, Unit 1 was already planning to implement upgrades to address things such as multiple spurious operations.

And so, we've tried to stay consistent with where they have stood on the various upgrades in the plant.

So, it started with the existing fire protection report that existed in about 2008 to 2009, which is that Revision 39, and we built upon it.

We will also ensure that the later revisions that have happened to the Unit 1 report, I think they are currently up to about Rev 45 right now, all of that

will get rolled into the dual-unit report when we issue the as-constructed report.

Doing the as-constructed, we will incorporate the Unit 2-specific equipment and cables in there. That includes both classic fire protection for sprinklers, detection, separation, emergency lighting, et cetera, as well as the equipment required for safe shutdown. These are the pieces of equipment and the cables required in order to mitigate the effects of the fire.

As I said, we've incorporated various upgrades just like Unit 1 is doing. We have addressed multiple spurious operations, which I'll address a little bit more in the future. We've also performed modifications to reduce the number of operator manual actions.

What we've primarily looked at is the short-term OMAs. These are the OMAs that are two hours or less, because they have the greatest need for being - ensure that the actions are feasible, reliable and can be accomplished within the time required.

So, we performed various modifications such as rerouting cables, adding main control room switches, et cetera, so that the actions can be completed in a timely, reliable manner.

We also performed the feasibility and reliability evaluations as directed by Reg Guide 1.189 and NEI 00-01.

So, in doing those, and I'll talk about those a little bit more later on, we have ensured that the Unit 2 and common actions are both feasible and reliable.

MEMBER STETKAR: You mentioned your assumption that the operators are perfect after two hours, which is basically what the -

MR. CROUCH: Not that they're perfect, but they're - after two hours, we have additional staff coming in and the time requirements become much longer.

MEMBER STETKAR: So, you didn't evaluate the feasibility of any actions. So, the actions are perfectly feasible.

Did you look at the scenarios to confirm that indeed that's the case?

MR. CROUCH: We looked at the scenarios to ensure that the actions that we said were needed, we looked at the timing of them to ensure what the time requirements were for them.

MEMBER STETKAR: As long as it was less than two hours. Did you look at scenarios that had time - suppose you needed 35 people to accomplish the actions

within two and a half hours.

MR. CROUCH: No, we have got the staffing looked at to ensure how many actions can be done by various people. And part of the feasibility and reliability evaluation is to look at the actions that are required and how many AUOs and ROs that you have on site to perform them.

And then you compare that number of required AUOs to the number of available AUOs.

MEMBER STETKAR: Is that two-hour limit consistent with regulatory guidance?

MR. CROUCH: Charles can confirm for me, but I believe that is true, isn't it?

MR. BRUSH: The operator manual actions that are required to be performed at two hours or greater are evaluated in a calculation, the feasibility and reliability of those, but they're not included in the fire protection report. But they have been evaluated to the same criteria.

MEMBER STETKAR: They have been evaluated, okay.

MR. BRUSH: Yes.

MEMBER STETKAR: Where are those evaluations documented, Charlie? Are they in backup calculations?

MR. BRUSH: Yes, sir, they are.

MEMBER STETKAR: Okay, thank you. Thank you.

MR. CROUCH: Okay. For classic fire protection features, most of the dual-unit program features were already in place. Such things as the Fire Operations Department, the fire brigade, they're fully operational, fully trained for fighting fires.

The various equipment, surveillance programs, going and surveilling your pumps, your hydrants, your sprinkler systems, all those processes are in place.

We have a very robust combustible control program, ignition source control program and impairment control programs. Those programs apply to all locations in the plant.

For dual-unit operation, also, most of the required equipment was installed prior to Unit 1 operation. Such things as detectors, sprinklers, emergency lighting, communications, et cetera.

There are a few locations, though, where we have had to install additional equipment to address either specific OMAs or places where the original equipment had just not been installed yet.

Some examples were the reactor building annulus detectors and sprinklers. We've had to expand

those to cover the cable trays in the annulus.

We've added a few fire dampers for walls that were not - that are not currently for Unit 1 operation considered fire barriers, but they will be considered fire barriers for dual-unit operation.

We have added emergency lights to address the new OMAs. We will have sealed all the penetrations between the floors, walls, et cetera, with fire seals.

We also will have added the reactor coolant pump spray shields and the reactor coolant pump oil collection system will be installed.

MEMBER STETKAR: Can I ask you about the fire brigade? The fire protection report says that each shift fire brigade has a fire brigade leader and four fire brigade members. So, there's a complement of five people.

And the fire brigade shall not include the shift manager or other members of the minimum shift crew necessary for safe shutdown of the unit nor any personnel required for other essential functions during a fire emergency.

And it also notes that there's an incident commander available to direct each shift fire brigade. The incident commander meets the requirements of a unit supervisor or shift technical advisor.

I couldn't find in Chapter 13 of the FSAR the TVA's commitments for minimum shift staffing. So, I was curious, in practice, who is on the fire brigade?

MR. CROUCH: Steve or John, you want to answer that?

MR. STERCHI This is John Sterchi. I'm the fire marshal, Watts Bar. And the fire brigade is made basically of the fire brigade members out of fire operations, which are not licensed personnel. They are a foremen and four members of crew.

Then on top of that, they have an advisor from operations for, you know, to kind of give you a different terminology. They have an advisor from operations with an SRO license that's usually the Unit 2 SRO right now. And he gives them oversight and guidance of what he wants to see them do relative to the fire-fighting aspects in responding to fire events.

MEMBER STETKAR: Now, if the Unit 2 SRO is serving as that what's called in the fire protection report an Incident Commander, isn't the Unit 2 SRO also responsible for safely shutting down the unit?

MR. STERCHI: Right now the Unit 2 is not in operation, sir.

MEMBER STETKAR: Well, but I'm presuming that indeed Unit 2 will eventually get a license and

be operating. So, I'm actually talking about who is going to staff the fire brigade under combined Unit 1 and 2 operation.

MR. SMITH: This is Steve Smith again. The incident commander position from an operations perspective and the definition of his requirements you read, is a staff position for the units.

The staffing corps operating the unit, shutting down the unit is separate from this incident commander.

MEMBER STETKAR: So, this is a different physical body?

MR. SMITH: That is correct.

MEMBER STETKAR: Okay.

MR. SMITH: We've changed that from where it used to be STA could serve both functions, but we've rewritten our procedures and now the incident commander can't do that, unit SRO or the STA.

MEMBER STETKAR: Or the STA.

MR. SMITH: That is correct.

MEMBER STETKAR: Thank you. And in terms of fire brigade staffing, I wanted to make sure because you said that the fire brigade was staffed from non-licensed operations personnel, auxiliary unit operators?

MR. STERCHI: No, sir. These are not ops personnel at all. These are not AUOs. They are personnel that are hired out from the craft and some former operations-type personnel to perform this fire-fighting. And they also perform testing of this equipment.

MEMBER STETKAR: Okay. And that's 24/7?

MR. STERCHI: Yes, sir.

MEMBER STETKAR: Thank you. Thank you very much.

CHAIRMAN RAY: As long as we're on that, though, let me ask a question on the fire brigade. It says that it may comprise - I'm reading from the SSER. I have to correct the grammar here a little bit.

May comprise less than five members for a period of time not to exceed two hours to accommodate unexpected conditions such as unplanned absence or brigade response to a non-fire emergency.

Is that a normal caveat to staffing? I mean, it seems -

MR. SMITH: Yes, sir. The tech specs are a minimum shift staffing. The fire brigade, any of those positions that are required has that caveat for two hours for unexpected absences to get the minimal staffing of that.

CHAIRMAN RAY: So, that's tech spec language then?

MR. SMITH: Yes, sir.

CHAIRMAN RAY: Okay. Not sure how to - it gets enforced, but that's okay. If it's in the tech specs, then it's subject to oversight.

MR. SMITH: Okay.

MR. CROUCH: Okay. Page 27. Just so everybody is clear, Watts Bar is an Appendix R plant. We'll be licensed to Appendix R Section III.G, III.J, III.L and III.O. You can see they are the top two items. We are not implementing NFPA 805 at this time.

In conjunction with the letter that you referred to earlier which basically gave the general guidance that says Unit 2 will be licensed to the same licensing basis as Unit 1, we are sticking to the same Appendix R licensing basis.

And so, we are - TVA will be evaluating NFPA 805 in the future, but that is not part of the licensing for Unit 2 at this time.

CHAIRMAN RAY: No comment, John?

MEMBER STETKAR: I'll get to it.

CHAIRMAN RAY: Okay.

MR. CROUCH: In order to perform the fire safe shutdown analysis itself, there's various tools

and inputs that are required.

The biggest tool that you use is a computer program. It's basically a proprietary interactive databases entitled "SAFE." This is basically a large database that you feed into it all the basic geometry of the plant. The plant is divided up into fire areas, analysis volumes. Analysis volumes represent subdivisions of very large rooms.

You feed into it the equipment and cable data based on the Unit 1 as-constructed data and the Unit 2 as-designed information. So, this gives the location of the major end devices, as well as all the power and control cables, instrumentation, et cetera, that's needed for the mitigation-type functions.

You also go and review the combustible loading in the various rooms, the compartmentation, detection, suppression. And then you also may have to do some deviations or evaluations if you're not strictly conformed to Appendix R. That's all documented in the fire protection report itself.

When you start through the analysis process, you've got various functions that have to be fulfilled.

You have to maintain reactivity control, reactor coolant pressure control, residual heat

removal, process monitoring and various support functions.

So, as you start through the analysis, the computer program looks for each one of these functions to ensure that the pathways are satisfied to do this.

It will look to make sure that both the power cables, instrumentation, the control cables, everything is available for doing that particular function.

It will identify to you the potentially affected equipment. Or if you tell the database I want to look at a fire in this area of the plant, it will tell you what equipment is affected and which equipment can be credited.

It is a very interactive database in that it shows you if you have any problems that you then have to go and take mitigating actions to either reroute, relocate or various actions to do this.

MEMBER SKILLMAN: Bill, as you mention that, is the information that is used coming out of SAFE? Is SAFE the main intellectual tool that will identify on a per function basis what devices and what areas must be protected?

MR. CROUCH: There is various calculations that go through that tabulate all the major end devices. And then there is design data that gives you the routing

for the cables, the location of the equipment, et cetera.

That all gets fed into SAFE, and then SAFE does the analysis itself.

MEMBER SKILLMAN: Okay.

MR. CROUCH: And it's an interactive database such that if a function is not satisfied, it graphically gives you a little indication that says that this is a failure.

MEMBER SKILLMAN: What actions ensure that the safe database is verified accurately?

MR. CROUCH: The information is - and Charles may have to expound upon this, but the information is put in and two-party verified.

The as-designed information goes to the design process to ensure that the design is sound. That's just part of the normal nuclear plant design process.

The contractor or EPM that does this, they take the as-designed information, they add it into the database and they verify it.

Charles, do you want to add anything to that discussion?

MR. BRUSH: Only that it is a QA database and all of the inputs are two-party verified.

MEMBER SKILLMAN: Does your fire marshal and

those who will fight the fire have enough confidence that SAFE is accurate that they will depend on it?

MR. CROUCH: John.

MR. STERCHI: Yes, sir. We have confidence that the SAFE program provide us the information needed relative to the ops folks also relative to the areas that are of concern and what equipment needs to be protected.

MEMBER SKILLMAN: Do you drill or rehears your fire brigades based on some perturbation on SAFE or based on some way to initiate action so that you are constantly comfortable that the SAFE information is accurate? How do you drill?

MR. STERCHI: We drill basically on the starred areas in the plans as are written today.

MEMBER SKILLMAN: Based on the information coming out of SAFE?

MR. STERCHI: Yes sir, the plans are written on the information coming out of SAFE as applicable. The main course that we have is to address each individual fire area which of course SAFE is based on those fire areas and analysis volumes.

MEMBER SKILLMAN: Okay. Thank you.

MR. STERCHI: Yes, sir.

MEMBER STETKAR: Bill, I don't know when to

ask this - or these, actually, more correctly. So, you're going to have to guide me a bit.

I must admit I didn't read through the entire fire protection report. 1690 pages is a little more than even for me to digest.

I looked at a bunch of it and I had some questions about the evaluations of several areas in the plant. You're not going to cover those certainly in this presentation, but I do have questions.

And some of those questions actually can support the concern that Dick raised. So, I don't know when to do that.

Do you want to get through all of your presentation and then go back to details or -

MR. CROUCH: Doesn't matter.

MEMBER STETKAR: - should we do it now?

MR. CROUCH: It's up to you.

MEMBER STETKAR: I don't care.

MR. CROUCH: Okay. Why don't we finish this, and then we'll go back to more specific questions then.

MEMBER STETKAR: Okay.

MR. CROUCH: And it may be that some of this gets answered as we go on.

MEMBER STETKAR: It may. So, that's

probably the best plan.

MR. CROUCH: So, next slide. Okay. As we talked about, you feed all this information into SAFE and SAFE verifies that the functions are satisfied.

As I mentioned, it's an interactive database that gives you a visual indication of whether it completes all the various functions.

If a function is not satisfied, then you can identify mitigating actions such as separating equipment, protecting equipment with such things as fire wrap.

You could utilize different equipment. You can make cold shutdown repairs. And then there are operator actions which are divided up into both main control room operator actions and local operator actions out in the plant.

The analysis is summarized in Part 6 of the fire protection report. And when I say summarized, Part 6 is several hundred pages. I didn't exactly go and count the number of pages. There's probably six to 800 pages in Part 6, but that is just a summary of the overall calculation that's about 14,000 pages long, which is much too big for most of us to be able to comprehend.

So, as a result instead, up in the very front of the report in Chapter 1, there is a summary table.

And I've given you just a single line here out of the summary table.

The actual table is about 12 pages long and it covers all the various areas of the plant. And what this table will tell you is that if you start looking at this table on the left-hand side, it will give you a fire area number.

The plant is divided up into roughly a hundred something fire areas, your fire areas and analysis volumes. It tells you what the room descriptor is itself, and then it kind of summarizes the overall analysis.

It tells you if they're safe shutting down equipment in the room or not, equipment or cables. Tells you if there is detection in the room, suppression in the room, if you've used any kind of fire wraps to protect the cabling.

It tells you what the combustible load is in the room, how long the fire is expected to last. It tells you if you've had to use any deviations in this room.

For example, this one used deviation number 2.4, which has to do with intervening combustibles.

It also tells you if there's any evaluations in the room. For example, evaluation 3.4 or section

3.4 out of the report had to do with large fire dampers. We have a couple of large fire dampers out in the plant that are on the order of 25 by a hundred inches.

It tells you if there's any cold shutdown repairs required for the room. And then finally it tells you how did you comply with Section III.G.

There's - you have to look just before this table to give you all the various codes. But, for example, Code 2 C tells you that there is a one-hour fire barrier with sprinklers and detectors. This is 3.G.2.C section. It tells you exactly what it is.

It also tells you if there's any operator manual actions. In this case, there is a 1-G which tells you there's a Unit 1 action. And it's what's referred to as a green box. In other words, it's required for safe shutdown. And there's also a Unit 2 green box action.

If there was what's called an orange box action, important to safe shutdown, it would be like a 1-O or a 2-O.

So, this summary table gives you a huge amount of information to help you digest the overall report without having to read the several hundred pages that are back into Part 6.

MEMBER STETKAR: Is there some reason that

you did not include the plant layout drawings with the definitions of the fire areas and -

MR. CROUCH: That will be in the report.

MEMBER STETKAR: Oh, they will.

MR. CROUCH: They -

MEMBER STETKAR: okay. I didn't know whether they were excluded for -

MR. CROUCH: No.

MEMBER STETKAR: - security reasons or something.

MR. CROUCH: They belong in Part 2.

MEMBER STETKAR: Yes, they do.

MR. CROUCH: And one of our commitments is to -

MEMBER STETKAR: Okay.

MR. CROUCH: - submit those.

MEMBER STETKAR: Thanks.

MR. CROUCH: If you'd like, I've got a copy of them I can hand to you.

MEMBER STETKAR: No, it's too late.

MR. CROUCH: Okay.

MEMBER SKILLMAN: If we were collectively on watch in the control room right now and we received a fire alarm and it led us to Area 15-2 and to this heat and vent equipment room, would among our first actions

be to pull a chart that tells us what is in that room and how it is protected as we see here?

MR. CROUCH: The first thing that happens in the plant is we have an abnormal operating instruction, AOI 30.1. It's entitled "Plant Fires." And the shift room personnel would go and evaluate whether or not they need to enter the Appendix R-type procedures.

If they determine that they do, they go to a different AOI. That's AOI 30.2. That directs the - how you go about and start mitigating the actions.

From that, there are various sub-procedures that address each room individually that gives you specific actions to go perform.

Is there anything else you can add, Steve?

MR. SMITH: This is Steve Smith again. The plant fire procedures, like you said, are abnormal operating instruction Number 30. It's divided into two sections in normal plant fire.

And then if you were to have indications of an Appendix R fire, then you'd transition into the 0.2 section of that procedure, which is divided into those areas that are listed in there; Area 52, 54, whatever area it might be.

And so, you go to that section and it

delineates the operator actions that are required to be performed for a fire in that area.

MEMBER SKILLMAN: Thank you.

MEMBER STETKAR: Steve or Bill, this may help me in a few slides. In the Fire Protection Report there are some definitions and timelines. And it's noted that, number one, T zero begins - it occurs when the reactor is tripped.

It's also noted that all of the operators for the operator manual actions are dispatched either from the main control room, which would be the normal place, or the auxiliary control room if you had to abandon the main control room.

Does that mean, in practice, that if you do have an Appendix R fire such that you need to perform local actions out in the plant, do the AUOs go to the main control room, they're issued procedures, and then they go out in the plant from there, or how does that work, in practice? I'm thinking about people.

MR. SMITH: It can be done both ways. Initial - when you have the initial fire, they allow 30.1 series of a normal plant fire. There's a point from that procedure prior to and in Appendix R that the AUOs that are assigned to the Appendix R fire brigade, they report to the control room and get out their SEBA

equipment and stuff assigned to them and standby in the control room -

MEMBER STETKAR: Okay.

MR. SMITH: - for the transition to the other AOI to go in the Appendix R fire.

MEMBER STETKAR: So, they're ready, but they do go to the control room.

MR. SMITH: Right.

MEMBER STETKAR: I mean, the people can be in the - forget the auxiliary control room for the moment. That only adds another complexity.

MR. SMITH: But once those guys are dispatched into the field -

MEMBER STETKAR: Then they go out with wherever they're assigned.

MR. SMITH: And then if there's something different that comes up while we're out there, then it could be over the radio or -

MEMBER STETKAR: Yeah, I understand, but, I mean, at least the initial dispatch to do the -

MR. SMITH: That is correct.

MEMBER STETKAR: - procedurally-directed actions -

MR. SMITH: Yes.

MEMBER STETKAR: - happens that way.

Thanks.

MR. SMITH: That helps us from T-0 to the time that action is being completed --

MEMBER STETKAR: Yes.

MR. SMITH: - just get that in better shape.

MEMBER STETKAR: Okay.

MR. STERCHI: One clarification. Mr. Smith mentioned fire brigade AUO -

MEMBER STETKAR: Yeah, I got that. That's the only thing that I wanted to establish, really. The fire brigade people are different bodies.

MR. STERCHI: Different bodies in -

MEMBER STETKAR: These are AUOs who turn valves and push buttons and do what they do, okay.

MR. STERCHI: Yes.

MEMBER STETKAR: Thank you.

MR. CROUCH: Next slide. Also as part of going to the dual-unit operation we've had to perform modifications.

We've restored, in some cases, Unit 2 capabilities. Since up until now we have been a single-unit plant and in some cases Unit 2 has relied up on some of the installed backup capability within Unit 2 - Unit 1 has relied upon the backup capability of Unit 2 as part of single-unit operation.

So now, by going back to dual-unit operation, we've had to go and perform some modifications over in Unit 1 to protect the Unit 1 equipment and various actions so that Unit 2 can basically retain the function of the Unit 2 equipment that's needed.

We've had to open up various cross-connect valves as part over - the operation of Unit 1 we had basically isolated off Unit 2 so that the - you do not have water going out into the incomplete portions of the plant. So, we've had to reopen those valves as part of the overall completion of Unit 2.

In some cases we've had to address dual unit equipment capacity issues in terms of looking at the amount of cooling that's required for two units if you had a fire in a common area.

So, we've performed modifications such that, for example, during an Appendix R event we can add two ERCW, essential raw cooling water pumps onto a given diesel.

You don't do that during a LOCA because of diesel loading issues. But during Appendix R where it's much more lightly loaded, it's acceptable to do that because we've added switches into the plant for doing things like that.

And then we've had to perform modifications to address the safe shutdown analysis itself; relocating equipment, modifying control circuits.

In a few cases per valve, we've removed mode of power to making sure that you don't have spurious operation of valves, and then we're doing circuit protection, fire wrap, some fire dampers, penetration seals, et cetera.

CHAIRMAN RAY: Let's go over that second thing on there again. Again, what I understand is this created a capability to power equipment from either unit and/or make the equipment available?

MR. CROUCH: No. In this case, the essential raw cooling water pumps which are out in the intake station, there is four alpha pumps and four bravo train pumps. And it's setups that you have - normally have two alphas and two bravos available at any time. And they will load onto the four diesels that exist.

Well, during certain Appendix R scenarios, we get to the point that we need to have two of the alpha pumps under the same train. And so, we've allowed it to be able to go get two of those pumps and load them onto a single diesel.

CHAIRMAN RAY: I'm trying to picture that in my mind, because the - I've dealt with the issue of

train separation in a dual-unit plant on the electrical side before. Just the way you described it sounded -

MR. CROUCH: You're still loading the same train pumps onto the same train diesel. You're not cross-training.

MEMBER SKILLMAN: Well, I'm with Harold because until you began to explain this I had a little different evaluation in my mind.

If you load the second alpha pump on the alpha diesel and then you have a loop for whatever reason, lightning, natural phenomenon, have you now loaded that engine to the point where it can no longer respond to what are normal loss of offsite power loads?

Is this loading of the second alpha pump automatically strip triggers that have to be manually stripped?

MR. CROUCH: Now, we've done - diesel loading analysis show that for Appendix R loading that it's acceptable for having both those pumps on the diesel with loss of offsite power.

CHAIRMAN RAY: There's a test open item that says you're going to demonstrate this as part of testing, as I recall. An open item that deals with demonstrating that you have the capability to determine what's needed for both units.

Am I remembering that correctly?

MR. CROUCH: There is a test for doing that for a LOCA-type scenario.

CHAIRMAN RAY: Yes.

MR. CROUCH: This is not a LOCA scenario. This is an Appendix R scenario.

CHAIRMAN RAY: No, I know that, but he was asking about if you had an accident - we're trying to remember something that -

(Simultaneous speaking.)

MEMBER SKILLMAN: Well, this is the exact issue that Harold mentioned as the meeting began where we now have multiple shared systems and components, we're bringing Unit 2 online, we're going to be taking credit for what was there before, but what is there now and here's an example where we'll put two alpha coolant pumps on one alpha diesel.

MR. HILMES: Steve Hilmes, electrical I&C. What we have is we have four diesels, okay. You have - on each of those diesels you have one ERCW pump, okay, that is normally aligned to it.

However, in addition, you have four spare ERCW pumps also. So, you can normally run either one of those to either the normal or the spare.

MEMBER SKILLMAN: To the diesel.

MR. HILMES: To that one diesel. So, for this particular situation, all right, and those two pumps are interlocked. So, only one of the two normally can start on the diesel.

In this situation, what we do for Appendix R is give the ability to bypass that interlock so that we can load two, the normal and the spare pump onto that diesel.

And since we do not have accident loading sequencing on at the time, we have more than enough margin on that diesel to handle those two pumps.

MEMBER SKILLMAN: If you were to go into accident loading sequence, would the additional ERCW bump off of that diesel?

MR. HILMES: Actually, when you do that it would resequence and you would only end up with one pump.

MEMBER SKILLMAN: That's supposed to be aligned to that diesel.

MR. HILMES: That's correct.

MEMBER SKILLMAN: Okay. And with that one pump, that one diesel can take the additional electrical load that's necessary for that scenario?

MR. HILMES: With one pump, yes, that's the -

MEMBER SKILLMAN: The one ERCW pump.

MR. HILMES: Yes.

MEMBER SKILLMAN: Motor.

MR. HILMES: One ERCW pump.

MEMBER SKILLMAN: Yes.

MR. HILMES: So, it just gives you an ability to manually start the second pump, not automatically start the second pump.

MEMBER SKILLMAN: Okay. So, what you're saying is for Appendix R, there are some options that you have in terms of redundancy. But if you were to go into your normal loading sequence for an accident, that which you have done manually would be, if you will, defeated by the resequencing so that you would end up with the correct load application to the diesel engine.

MR. HILMES: Keep in mind during an Appendix R event, you do not assume an accident on top of that.

MEMBER SKILLMAN: I was just thinking of a very practical thing that can happen, which is loss of offsite power. And it comes just like that and you don't know where it came from.

MR. HILMES: Well, if we're to the point where we're loading these pumps onto the diesel, we've already lost offsite power.

MR. CROUCH: We attempt to respond to the event with normal offsite power. You wouldn't be in

this scenario until you already lost the offsite power.

MEMBER STETKAR: Is that - now, be careful. Is that actually true for every fire location? I don't think it is, because I seem to recall the analyses that some fire locations justify alignments based on the fact that there isn't any, quote/unquote, credible fire in the location that could actually cause the loss of offsite power.

So, I don't think it's presumed that offsite power is lost in every -

MR. HILMES: That is correct.

MEMBER STETKAR: Thank you.

MR. HILMES: But in order to have to limit it in this particular event -

MEMBER STETKAR: In this particular scenario, that's the only way you would get - okay. I see.

MR. HILMES: Okay.

MEMBER STETKAR: There was something I was going to ask - yeah, I might as well ask it now. The control building, everything in the control building is shared between the two units.

And I couldn't figure out where else to ask it. So, I'll ask it now.

A couple of questions. Number one, there's

a statement in the SER anyway, and I didn't try to find it in the fire protection report, it says main control room and cable spreading room are not separated by a rated fire barrier.

Does that mean that there aren't any penetration seals in the cables that come up into the main control room? Are they just open?

MR. HILMES: Steve Hilmes. They are - it is a, yeah, control room habitability zone, but we essentially consider the control building one fire zone.

MEMBER STETKAR: Okay.

MR. HILMES: Including the spreading room.

MEMBER STETKAR: Well, but you carefully didn't answer my question. My question was if I look in the main control room panels and look down where I see cables coming up, can I see daylight?

MR. HILMES: No, you cannot.

MEMBER STETKAR: They are sealed.

MR. HILMES: They are sealed.

MEMBER STETKAR: But they're not necessarily fire rated seals.

MR. HILMES: That is correct.

MEMBER STETKAR: Okay. Thank you.

The second question I had since everything in the control building from the perspective of your

fire protection report and fire hazards analysis is evaluated as a single fire area, in practice, how do you control main control room event?

I mean, I understand if a fire occurs in the main control room and it's full of smoke and you get a habitability issue. Everybody goes to the auxiliary control room. That's not what I'm concerned about.

I'm concerned about fires, for example, in other parts of the control building that may affect the ability of the operators to control functions, for example, from the Unit 1 main control board, but not necessarily the Unit 2 main control board.

You would need to abandon, in a sense, the main control room for Unit 1, but not necessarily the main control room for Unit 2.

How do you govern those main control room abandonment guidance in the plant? I mean, that must be controlled under some of these fire response receptors.

MR. SMITH: Excuse me. Steve Smith again. They allow 30.1 series that's for normal plant fires. There will be an AOI 30.1 in both control rooms.

MEMBER STETKAR: Okay.

MR. SMITH: And as we respond to this fire,

it would be easy for me to quote than try to explain it to you, but the decision of tripped unit and declaring an Appendix R fire is left to the judgment of the Unit SRO shift manager and must be based on the magnitude of the fire and its potential affect on the equipment and components necessary to achieve and maintain cold shutdown.

And then we have bullets that say multiple spurious operations, equipment start and stopping indications and multiple trains that you don't have that would say the control for the plant in the control room now is -

MEMBER STETKAR: Impaired.

MR. SMITH: Yeah, impaired.

MEMBER STETKAR: Okay.

MR. SMITH: Yes. So, we need to go to the aux control room to take control of the plant. So, each unit will be looking at those same criteria.

MEMBER STETKAR: Okay.

MR. SMITH: If that answers your question.

MEMBER STETKAR: Partially. It at least gets me into the area where I understand a little bit more.

The - I believe, however, because the fire hazards analyses are nice, perfectly square, perfectly

black, perfectly white-type analyses. Fire hazards analysis just says, well, I'm going to abandon the main control room. Everybody picks up and goes to the auxiliary control room. I believe that's the way that's implemented.

That's not the real way the world works, though. So, there's going to be some confusion. And my question is how does the fire hazards analysis for fires in the control building and specific analysis volumes in control building, if you want to call them that, handle the fact that it's not going to be necessarily clear who is going to pick up and leave the main control room at a particular time T-0, whatever that time T-0 might be depending on whether I'm sitting in Unit 1 or Unit 2.

Does it evaluate that? I don't think it does. I think it just cleanly picks up people and relocates everybody to the auxiliary control room and says, yay, verily we're now there and what, you know, what indications do we have available in the auxiliary control room and what other things do we need to do out in the plant.

MR. SMITH: I assume your question was centered around the calculation. From an operation perspective in the shift manager when it becomes time

that he don't have to control that unit, he'll go to the aux control room and keep that unit in cold shutdown from the aux control room.

MEMBER STETKAR: He will do that, but there are probably several locations in this control building where that decision will be made differently by the two different unit operators' shift supervisors at, perhaps, different points in time for different criteria.

Like I said, I'm not interested in a fire in the main control room where it's full of smoke. That's pretty clear.

I'm interested in all of those fires that happened elsewhere in places in the control building that can cause pretty strange responses. Some of them affecting both units, some of them affecting -

MR. SMITH: Procedures are cut and dry to the fact that once the SRO on Unit 1 or Unit 2 declares an Appendix R fire on that unit, he goes to the aux control room.

MEMBER STETKAR: I understand that. I'm trying to understand how realistic the fire protection analyses, the fire hazards analyses that support the fire protection report are compared to the way the world really works.

And it's not clear to me that the presumption of complete abandonment of the main control room under - as I said, I didn't read the whole report. And I don't - certainly don't want to. I don't have the backup. I don't want to see that.

But what I do want to have is confidence that we're not being optimistic by presumption that everybody picks up and moves to the aux control room by not accounting for possible confusion in the main control room and because there's a lot of shared systems, the possibility that the operators on one unit might be reluctant to leave.

So, that's why I'm thinking - because the fire hazards analysis sort of just treats these as one fire area.

MR. CROUCH: We need Charles to speak to this. But I think what you're basically saying is that if you have a fire in some location that causes one of the two control rooms to be abandoned, are there any adverse consequences of operating one from the aux control room while you continue to be able to operate the other one from the main control room.

MEMBER STETKAR: That's a better way of characterizing it, yes.

MR. CROUCH: So, Charles, how would you

respond to that?

MR. BRUSH: The Fire Hazard Analysis would direct both units to be shut down from the auxiliary control room. It does not evaluate shutting down one unit from the control room and the other from the aux control room.

MEMBER STETKAR: So, what I'm hearing is he basically didn't look at that condition that we just discussed.

MR. BRUSH: That is correct.

MEMBER STETKAR: Where the operators would be - and you said shutting down. They wouldn't even necessarily need to shut down one unit depending on the actual effects from the fire.

I don't know how your procedures are -

MR. SMITH: The two-unit procedure I haven't seen. But if the -

MR. BRYAN: This is Bob Bryan. Steve, if the Unit 1 shift manager says, abandon the control room, what are the Unit 2 control room operators going to do?

MR. SMITH: Well, right now without the unit running -

MR. BRYAN: No, with in two-unit operation.

MR. SMITH: Well, if they allow us, we're going to abandon both units to the aux control room and

all of them flee.

MR. BRYAN: So, directed by procedures.

MEMBER STETKAR: But you don't have those procedures written yet?

MR. SMITH: I'm sure it's written. I haven't seen it.

MEMBER STETKAR: Okay. I'd be curious to see that, because we've struggled with this quite a bit. Harold mentioned that at the 805. We struggled with this quite a bit in shared control rooms under NFPA 805, for example.

When are decisions made to abandon how many of the control stations given a fire in a particular location and, you know, its effects on the actual controllability of the unit? Either one unit, or two units or partial units or whatever.

And, indeed, we found some conditions where the presumption that the fire is clean, that everybody just picks up and relocates for both units, can be optimistic if you look at what the operators might have available to them and what kind of indications they might have available.

So, if the procedures are written, I guess I'd be interested in seeing those procedures. If they're still in very preliminary draft form, that's

the way they are, but I'm just sort of raising the flag that if the Fire Hazards Analysis hasn't examined that kind of scenario and it might have some unintended optimism in it.

I don't know that, I mean, you know, it's a difficult analysis, but it's just something that I'd like to bring up.

MR. HILMES: Steve Hilmes, electrical I&C. Charles, doesn't the - when you abandon control room, doesn't it direct you to trip both units essentially and go to the aux control room?

MR. BRUSH: Yes, the procedures will direct the operators to trip both units and abandon the control room and shut down both units from the auxiliary control system.

MEMBER STETKAR: That's presuming that the fire behaves the way that the analysis says the fire will behave, which means the fire requires the abandonment of both units.

Right, Charles?

MR. BRUSH: That is correct.

MEMBER STETKAR: Okay.

MR. BRUSH: That's the way the analysis is done.

MEMBER STETKAR: Right. I'm not talking

about the analysis now. I'm talking about the real world where we have a fire where people over on Unit 1 lose control because of spurious indications or lack of power or whatever.

And they decide - the unit SRO says I can't control this unit anymore, we're going to relocate to the aux control room.

The guys over on Unit 2 might have some valves that misposition, but most of the equipment is unaffected. My question is, are they also going to abandon the main control room?

PARTICIPANT: Yes.

MEMBER STETKAR: They will?

PARTICIPANT: Absolutely.

MEMBER STETKAR: So, you're going to have your operators go to a place where they're not used to operating with a limited set of indications and controls in that place, and require operators to perform things out in the plant manually, locally, under conditions where they could have controlled Unit 2 with no problem at all simply because the Fire Hazards Analysis says that's the way we analyze the plant.

That, to me, doesn't sound very prudent.

CHAIRMAN RAY: Is there a follow-up, John, that we can create here that -

MEMBER STETKAR: No, I just wanted to get something on the - I want to see the procedures, the actual procedures.

CHAIRMAN RAY: All right. That's what I'm asking about, yeah.

MEMBER STETKAR: Because if they do that, I mean, if they actually tell everybody to leave for both units to go to someplace where they have limited indications and controls, and when they're in that location they can't control all the equipment, they can't for the design Appendix R fire, quote/unquote, to me, that doesn't necessarily seem prudent.

CHAIRMAN RAY: Okay. But so when you have some, like I say, follow-up that's responsive, you'd like to see procedures?

MEMBER STETKAR: I'd like to see what they're actually going to do. Because if they abandon both units for any indications that they should abandon either one individually, it's not clear to me that that's - I don't know how to think about that.

CHAIRMAN RAY: All right. Is it clear that the - what it is he'd like to get some more information about?

MR. CROUCH: Yes, we have the action.

CHAIRMAN RAY: Thank you.

MR. SHUKLA: Is this on the same control room shared by dual unit?

MR. CROUCH: Yes, it's the dual-unit control room.

CHAIRMAN RAY: Okay. Let's proceed.

MR. CROUCH: 33. As part of the overall site, we've been addressing multiple spurious operations in accordance with Reg Guide 1.189 Rev 2 and NEI 00-01 Rev 2.

As going through this process, we've utilized the PWR owners group list of MSO scenarios. There's basically 54 scenarios that are tied back to those same control functions that I talked about earlier so that the scenarios will look at various multiple spurious operations that could affect the ability to perform those functions.

The NEI guidance gives you one method for determining which of these scenarios are applicable units, what's referred to as the expert panel methodology.

Unit 1 had previously gone through and conducted an expert panel review of MSO scenarios for single-unit operation.

So, Unit 2 we have utilized that same expert panel review results, but we've augmented it by looking

at possible scenarios that could result in dual-unit operation.

We've also gone and looked at the Sequoyah MSO expert panel results to determine if there was any additional things that they had had to do as a result of dual-unit operation.

Then we performed various modifications and actions, same type of actions for rerouting cables, protecting cables, et cetera.

MEMBER STETKAR: Bill, when I was reading the SER, and this again is from the SER, so I got a little confused, the SER talks about the Unit 1 evaluation. And then the SER flips and talks about Sequoyah.

And for some reason, the impression that I got from the SER was a little different than the impression that I got listening to what you just said.

Did you do an expert panel review of dual-unit Watts Bar-specific multiple spurious operation scenarios, or did you just take the Sequoyah multiple unit and say, yeah, this would probably apply at Watts Bar or, no, this probably wouldn't apply at Watts Bar?

MR. CROUCH: We took the single unit and then reviewed it to determine is there any new scenarios or variation of those scenarios that would be created by

dual-unit operation.

MEMBER STETKAR: You did Watts Bar specifically?

MR. CROUCH: Yes.

MEMBER STETKAR: And then you just peripherally looked to see if there was anything else from -

MR. CROUCH: Yes.

MEMBER STETKAR: Okay.

MR. CROUCH: Looked at Sequoyah also to see if there was anything else.

MEMBER STETKAR: Okay. Great. Thanks. Thank you.

MR. CROUCH: Another one of the major efforts that we went through was what we referred to as our feasibility and reliability evaluations. This is the process that's outlined in NUREG-1852 and Reg Guide 1.189 Revision 2.

To do this, what your overall intent is to ensure that your operator manual actions, and these are the ones that are basically the local ones that are out in the plant, you have to make sure that they're feasible and reliable.

So, you go and look at the fire prevention in the area that they've got to be performed, the

detection, the extinguishment-type capabilities.

Then in order to determine that they're feasible, what we've done is we've gone and utilized the Unit 1 walkdown information with the initial assumption that the same operator manual action is we've got an action in Unit 1 and we know we're going to do the same action in Unit 2.

If the equipment is located in the same general area of the plant, we have assumed up front that the timing that we've demonstrated for Unit 1 will be the equivalent timing for Unit 2.

Now, we will verify that once all the Unit 2 equipment and cables gets installed. We will have written our actual AOIs, the 30.2 procedures that Steve talked about, and we will go out and reverify this as part of the Unit 2 process.

So, for up front when you read the current fire protection report, it's based upon as-designed information for Unit 2 coupled with the Unit 1 walkdown-type findings.

In order to ensure that actions are reliable in addition to being able to demonstrate that you've got the minimum time available, that you can meet the minimum time available, you have to have additional time available for reliability to ensure you - if the operator

was to encounter adverse environmental conditions on the way to pick up his equipment, you know, whatever he might encounter along the way, we ensure that there is additional time available to ensure that he can get the action done within the required time.

We've also reviewed to make sure that the local equipment is functional. The indications are available that he'll need out in the areas where he's going to. We've looked at the environmental factors. We've reviewed the portable equipment, such things as the self-contained breathing apparatus, the portable lanterns. We've looked at the requirement for having the procedures and training.

For the initial review, we've assumed that the procedures for Unit 2 would be very similar procedures for Unit 1. So, that will be part of the final as-constructed information.

Then we - then the final product of this overall feasibility and reliability evaluation is to go look at the staffing that's available - staffing that's required and then compare it to staffing that's available to ensure that your required number of AUOs that we've demonstrated then can meet the timing is within the overall shift complement that will be available for dual-unit operation.

MEMBER SKILLMAN: Do you actually rehears to validate the acceptability of the time for feasibility and reliability?

MR. CROUCH: Yes. We will go out and perform an actual walkdown in the plant to essentially rehears the actions to ensure that they can be performed within the time that you've assumed.

MEMBER SKILLMAN: Thank you.

MR. CROUCH: And they are timed to walkdowns.

MEMBER STETKAR: We're going to spend a little time on this, because I went through the fire protection report and there's some locations where you need to dispatch six, seven, eight - eight being all - auxiliary unit operators to do things for that fire scenario. All the auxiliary unit operators.

If I look at some of the timing analyses, I see times like, well, this operator manual action can be accomplished in three minutes. This operator manual action can be accomplished in less than four minutes. In two minutes.

T-0 starts when the reactor trips. I have assembled in the main control room, as I understand it now, the group of auxiliary unit operators. The shift supervisor now must say, we have an Appendix R fire. You, unit operator Joe, take this procedure and

implement these actions. You, unit operator Ralph, take this procedure and implement these actions and so forth. Then they have to go do those things.

I looked at some of the required actions, for example, bit isolation is one of them, where one operator has to go from the main control room out into the auxiliary building to - I'll call it a switchgear room. You might call it a board room or something like that.

Energize the motor operator for a valve. Hit the close button for that valve. And then go to another room. Energize the motor operator for a valve and hit the button for that valve. And both valves must be closed to satisfy the function that the operator is trying to get, because they are two parallel valves.

It strikes me that it's going to be pretty difficult from time T-0, the reactor trip, for that one guy to get both of those valves closed in less than three minutes. So, I'm curious about how these timing analyses were performed.

Yes, indeed, if I told somebody, you go to that motor contactor and close that valve starting now, maybe they could do it in less than two minutes. That's one valve. That isn't the function of those two operator actions.

And it's not from T-0 when the reactor trip occurred. Because when the reactor trip occurred, you still have to get out all the procedures and figure out who's going to do what, where, when.

So, my question is, how realistic are all of these timing analyses that you've done for the operator manual actions.

They're not developed in the context of these fire scenarios, as best as I can tell. They're developed in the context of a specifically directed activity with perhaps timing for somebody walking from Point A to Point B.

And I don't know if you want to respond to that, but I'd be very curious because I want to understand from the staff more importantly than you, because how you do your timing analyses is kind of irrelevant, I want to understand from the staff how you've accepted all of these timing analysis in the context of the fire scenario.

When the staff comes up, we'll address it this afternoon. I don't know if you have any comments on how you've done these timing analyses, but they sound darn optimistic to me.

MR. CROUCH: Charles -

MEMBER STETKAR: It's important because of

- it's also important because of some of those time margins. I mean, you make arguments that because I can accomplish this action in two to three to four minutes and I have 20 minutes available, therefore I have, you know, tons of time margin available.

MR. CROUCH: Charles, would you like to respond to that?

MR. BRUSH: Just as a reminder that the performance times are derived from the performance times that were done for Unit 1.

That's the only comment I can make at this time.

MR. CROUCH: I previously demonstrated our capability to do these timings.

MEMBER STETKAR: Yeah, and I was pretty careful not to mention Unit 1, because that's a different issue. I'm assuming the staff is looking at the operator manual actions for Unit 1.

I'm thinking of Unit 2 in particular since that's the subject of what we're addressing and any events that affect building units, because those events do involve this multiple people doing different things in different locations.

MR. CROUCH: And as I mentioned earlier, we have performed numerous modifications in order to either

eliminate or extend OMAs for Unit 2.

If they had short duration-type times, we've taken actions in order to -

(Simultaneous speaking.)

MEMBER STETKAR: You know, I'll just leave it there because it's - I guess what I'm asking is, is confirmation that indeed the timing analyses which are key to at least the regulatory acceptance of these operator manual actions, that they're done under realistic conditions where time T-0 is set at the actual T-0 and then you start implementing the procedures from that time.

MR. CROUCH: Realizing that Steve talked about once they enter this AOI 30.1 plant fires and they summon all of the AUOs back, they already know where the fire is located.

And so, they've already got the procedure pulled out. They know where the fire is located based upon the fire detectors.

So, they've already - would already have the procedures pulled out. Probably already have them handed out so that your Ralph and Joe would already be opening them up.

MEMBER STETKAR: That's nice for a well-behaved fire. If the fire happens and the plant

trips, they now have to pull out the procedures and some of the people.

This is for a presumed smoldering little fire where not much is going on and, gee, we have a smoke detector alarming in Location X.

Sometimes fires - actually quite a bit fires happen that way. Sometimes they don't. Especially in areas that have electrical cabinets and switchgear and things like that.

Sometimes you actually get the plant trip shortly after you hit the fire alarm. So, you might not necessarily have that time cushion, the luxury of having, you know, people there and somebody pulled out the procedure.

But it's still true that if time T-0 happens, you know, when the reactor trips and now you dispatch the people, that's sort of the ground rules for the analysis. Joe - in fact, there's one action where Joe and Ralph both go to the same place.

Ralph energizes one motor control center from one switch, while Joe stands at a different motor control center and closes a valve.

It strikes me, in practice, that either Joe or Ralph would probably be assigned to do both of those things rather than the presumption that different

individuals do two things simultaneous - or actually sequentially they have to do them in the same place.

The sense that I get is that each OMA was evaluated individually in isolation without consideration of the actual fire scenario context, because individual OMAs are used for a variety of different fire scenarios.

Fire Scenario X will pick up OMA, you know, 1494. Fire Scenario YZAABB will also pick up OMA 1494. But, indeed, the requirements for each of those fire scenarios in terms of integrated response of the control room and the local operators may be much different.

So, you know, the concern here is that those OMAs and the response times be evaluated realistically based on the fire scenario as it's modeled in each location.

MR. CROUCH: As part of fire, when we go to the next page, one thing we're going to do is we will actually validate those procedures by doing actual walkdowns.

MEMBER STETKAR: But hopefully not in the context of Joe doing OMA 1494, which is Joe walks to that motor control center, turns the, you know, energizes the valve and pushes the button, because that's an individual OMA.

The function is to isolate the bid. Joe's got to go to two places, energize two motor control centers and close two valves to accomplish that function.

MR. CROUCH: Yes.

MEMBER STETKAR: They're defined as separate OMAs.

MR. CROUCH: Yes, but -

MEMBER STETKAR: That's not a single OMA.

MR. CROUCH: But in the AOIs, they are directed by AUO1, AUO2, et cetera.

MEMBER STETKAR: Okay.

MR. CROUCH: And it gives the sequential order that each OMA is to be performed in. It is divided by AUO so that they have a very specific task to go out, go to this room, and then this room, then this room.

MEMBER STETKAR: Okay.

MR. CROUCH: And that's what part of the walkdowns confirm that that action can be simulated and they don't go out and actually trip the plant or whatever, but simulate the action with the travel times.

MEMBER STETKAR: Okay.

MR. CROUCH: Next slide. So, remaining actions. Just what we were talking about. Procedure and equipment validation walkdowns.

This is a combination of walking down these procedures that we were just talking about, as well as going and walking the actual equipment down to make sure that it is really located where we have said it is, where the emergency lighting is focused on it, all the various aspects of the analysis to ensure that they are available, can be accomplished within the conditions to be expected during the event.

We also have to issue and train on the operator's safe shutdown procedures. That's sort of an integral task, along with these walkdowns. You have to have the procedures in the walkdowns that you go and perform the walkdowns of them themselves.

One thing we've got to do for Unit 1, is that the Unit 1 license right now in this license condition 2.foxtrot refers to SSER 18 and 19, which is written for this Unit 1/Unit 2 fire protection report.

We will have to go amend the Unit 1 license now to refer to SSER 18, 19 and 26, because some aspects of dual-unit operation will now be included in the related SSER.

We will also have to submit the as-constructed fire protection report which will include all of the verifications, equipment locations, the - it will include explicit Unit 2 walkdown times.

Right now in the Part 7 Section 8.3, it makes the statement that all these timings are based upon Unit 1 walkdowns. And so, we will replace those timings with the Unit 2 validated walkdown times.

We will include such things as the compartmentation drawing that will be validated by that time. So, we will submit the final doing our as-constructed report in - right now it's planned for October of next year.

MEMBER SKILLMAN: Bill, let me ask this question. I'm in your SSER 3.5.2. It is the fourth paragraph of that section. I'll read it to you.

TVA considers the following factors in its evaluation of these OMAs. Time, environmental factors, necessary equipment, procedures and staffing. Each of the factors included acceptance criteria. For example, all OMAs have allowable time of ten minutes or greater with a 100 percent margin. Factors that could cause delays in the performance of the OMA have also been considered. Factors such as lighting and communications are supported by plant calculations.

My question is, basis for the OMAs having an allowable time of ten minutes or greater and what is 100 percent margin in that context?

MR. CROUCH: Okay. Let's start with the 100

percent margin aspect of it.

MEMBER SKILLMAN: Okay.

MR. CROUCH: If an action is required to be performed within a certain time, say 20 minutes, we have to be able to ensure that the action can actually be performed by the operators in ten minutes. So, he's got a hundred percent margin available.

So, that will account for if he encounters unexpected conditions along the way.

MEMBER SKILLMAN: Okay. Should I interpret it - should I interpret this statement that the very minimum time that is granted to an operator is ten minutes, 600 seconds?

MR. CROUCH: Charles.

MR. BRUSH: No, you cannot. If you read on farther, I think it says that if we do not have a minimum time of ten minutes with a hundred percent margin and a specific analysis has to be done which includes time additions for various adverse conditions that may be experienced, the general criteria is ten minutes with a hundred percent time margin.

MR. CROUCH: And that's for local OMAs, correct?

MR. BRUSH: That's for local OMAs.

MR. CROUCH: Meaning out in the plant.

MR. BRUSH: Yes.

MEMBER SKILLMAN: This is for OMAs for SSCs that are important to safe shutdown. Thank you. I'm just reflecting on how I interpret that and it kind of ties into several of the questions that John Stetkar has asked. Thank you.

MEMBER STETKAR: I just remembered that by definition, an OMA is not something that's done in the control room.

MEMBER SKILLMAN: Oh, I understand that. I understand that.

MR. CROUCH: If you read in the fire protection report Part 6, it calls out the actions in the main control room followed by a section of the local actions.

MEMBER STETKAR: And the timing for some of the main control room actions could be -

MR. CROUCH: Right.

MEMBER STETKAR: - relatively short.

MR. CROUCH: Right.

MEMBER SKILLMAN: I'm reflecting on my own experience with three or four fires at a dual-unit plant where one unit was laid out, but I'm equally reflecting on some experience I had at sea and what it took to fight a fire and what was involved in terms of the logistics

of getting the brigade grounded and directed, bringing on additional equipment.

And I'm thinking this same issue to John's point to how much time do they have may be not as great as you may be thinking that they have. They may need more time to actually respond. Thank you.

CHAIRMAN RAY: Do you have closing remarks? Go ahead.

MEMBER STETKAR: I got pushed off. So, I'm coming back. I did have some questions that back we decided I'd shelve these until the end. So, I'm going to take them off the shelf.

And this is probably - there are a lot of details, but I wanted to try to get a sense of how the Fire Hazards Analyses were performed and what assumptions might have been made in them.

So, let me talk about some specific rooms that I just stumbled over, for lack of better characterization.

The first area is the containment spray pump rooms. And the prior areas if Charles wants to look them up, for example, 676.0-88914 and 15.

It says a fire in any of these pump rooms will damage the power cable for the pump. As such, the pump will be prevented from spurious operation given

a fire in the room. The undesired condition is you don't want the containment spray pumps to come on spuriously.

Now, my question is, does the Fire Hazard Analysis presume that every fire in the location will always damage the power cable and, therefore, the pump can't work even though there might be control signal cables in there that could cause spurious operation, or do those locations actually not contain any cables that could cause spurious operation?

Because as I read this, it sounded like you were taking credit for a fire always damaging the power cable to prevent the pump from operating.

And that gets back a little bit to Dick's question about how complete, for example, is the SAFE database in terms of the types of cables or the types of signals that you can get in a particular location.

Charles? And you may want to just take notes of these and come back this afternoon if they're detailed. Because trying to do this in realtime - or if not this afternoon, at some later date, because trying to do this in realtime could be difficult unless you have quick answers.

MR. BRUSH: No, I think you're looking for general information about the Fire Hazard Analysis. And in a specific case that you're talking about, the

containment spray pump room, all of the cables that could cause that pump to spuriously operate are included in the analysis.

MEMBER STETKAR: Then what -

MR. BRUSH: It just so happens that for a fire in the pump room itself, the power cable is the only one that would be affected. There are no control cables in that room that would -

MEMBER STETKAR: Okay. Thank you. That's the answer that I was looking for. There aren't any control cables in the room.

RWST, the tunnels from the offspill into the RWST have RWST level signals in them. And I don't know how the plant works. So, here's a how-does-the-plant-work question.

I know that the safe shutdown analysis - the discussion of those cable tunnels basically concludes that it focuses on spurious actuation of RHR or containment spray or opening of the reactor building sump valves. And it argues, well, fire in the location can't cause that. So, therefore, loss of RWST level indication isn't a problem.

I think that the fire safe shutdown analyses do include credit for makeup from the charging system; is that correct, Charles?

MR. BRUSH: That's correct.

MEMBER STETKAR: Okay. Volume control tank doesn't have enough volume, enough water in it typically for long-term makeup if I need to compensate from leaks or whatever.

And as best as I can tell, the analysis basically includes credit for transfer of the charging pump suction to the RWST; is that correct?

MR. BRUSH: That is correct.

MEMBER STETKAR: Okay. Now, how does the plant work? Does a low-level signal in the RWST block that transfer?

If it does, can a fire in the cable tunnel cause low-level signals that will block the transfer, therefore, disabling the charging pump's makeup function.

That's a question you want to go -

MR. BRUSH: The automatic function comes off the level transmitters, but the manual operation is not blocked.

MEMBER STETKAR: It's not blocked by low-level in the RWST?

MR. BRUSH: That is correct.

MEMBER STETKAR: Okay. Thank you. Some plants I've seen that low level will block both auto

and manual, because you don't want to have the charging pump sump from there.

Okay. That's a confidence builder. Some of these I'm just trying to get a sense of, you know, how deeply people thought about things. It's a matter of getting confidence.

Containment, the reactor instrumentation - it's called a reactor instrumentation room in the containment, has some transmitters and they're characterized as I&C cabinets. I'm trying to find my notes here.

Pressure transmitters. Pressurizer level transmitters. Cables for Train A and Train B containment isolation valves. Cables for Train A pressurizer. Train A and Train B pressurizer fuel RV block valves and some other stuff - cables. At least those are the cables that are listed in the fire protection report.

And one of the conclusions is, well, we don't care about fires in here because failure of the fire safe shutdown cables - and this is a quote: Failure of these FSSD cables would be detected and mitigated by normal plant procedures and would not initiate or result in a plant trip.

If I have fire damage to pressurizer

pressure transmitters, pressurizer level transmitters, fires that may cause containment isolation valves to go closed, I will not get a plant trip from that fire damage?

Part of this is, well, I don't care about this area, because I won't get a plant trip and I can handle it, you know, by normal mitigation - I won't even call it mitigation system. Normal operation's response to, you know, failed equipment.

And it was just really curious that you wouldn't get a plant trip from a fire in that area. If not automatic, then perhaps manual, because the auditors might not like to see pressurizer pressure falling or level falling. So, I'm curious about that conclusion.

And I'll just leave that there and I don't know if you -

CHAIRMAN RAY: Do you want me to follow up with a response?

MEMBER STETKAR: Yeah, but I think somebody has got to look at -

CHAIRMAN RAY: I understand.

MEMBER STETKAR: - more of the circuits. And I'm not sure they can do that in realtime here unless Charles has some more information.

MR. BRUSH: No, I think we'd like to look at that a little bit. It's other information in the Fire Protection Report that deals with that.

MEMBER STETKAR: Okay. So, we'll table that one for the moment. Then the last one that I had is fires in the diesel generator building either in the diesel rooms or the - this is a common corridor. I didn't have the layout drawing. So, I had to kind of guess about these things.

There's a statement that says - this is Section 4.4 for the Fire Protection Report, Part 7 4.4.

Diesel generators only required for those fire scenarios, they either result in or require postulation of a loss of offsite power. Offsite power capabilities would not be affected by a fire in any portion of the diesel generator building, including the corridor. That also addresses one of Dick's concerns.

The question is, are local control signals, manual, automatic, whatever, for the diesel generator output circuit breakers, can you shut the output breakers from the diesels from the diesel building?

MR. SMITH: NO.

MEMBER STETKAR: You cannot?

MR. SMITH: There's not a - there's no handswitch for the breaker on - you're talking about

the breaker that ties it to the shutdown board?

MEMBER STETKAR: Yes.

MR. SMITH: Its operators in the control room or out locally hit the breaker.

MEMBER STETKAR: Okay, okay. Thanks. I don't need to ask anymore then. Okay. My concern was sometimes those breakers are interlocked. So that if that breaker goes closed, you'll trip open the normal feed breakers to the shutdown board.

And although that's not a quote/unquote loss of offsite power, it smells the same. Okay. Thanks. That's all I had. Thanks.

CHAIRMAN RAY: Sure. We've gotten through all the items to complete. Anyway, you wanted to have closing remarks?

MR. HRUBY: Yeah, just briefly. We wanted to, again, express our appreciation to be able to come here and provide the ACRS with the plant status for the completion of Watts Bar 2 and also some of the technical presentations that were requested of us.

And with that, that concludes our presentation barring any other questions you may have.

CHAIRMAN RAY: Well, thank you very much. It was well done and on schedule. And like I said, we are struggling, as I know you are, with some of the

unique characteristics here and trying to make sure we get our job done without creating problems that we shouldn't be creating. So, that will make it a little less crisp, perhaps, as we come down toward this interim letter exactly what it is we're going to need.

We're going to need to find out from some of my colleagues, things that they're interested in at the full committee meeting that I don't - I'm not presently able to share with you.

With that, I believe we were going to have before lunch a report from Region II relating to inspection activities. So, if that's available, we will excuse you guys and let them come up and give that report.

MR. CROUCH: Thank you.

(Pause in the proceedings.)

CHAIRMAN RAY: Robert?

MR. HAAG: Good morning.

CHAIRMAN RAY: Ready to go?

MR. HAAG: I am Bob Haag. I am the branch chief in Region II. I have addressed the Subcommittee before. My branch has got sole responsibility in the region for inspection - construction inspection programs for Watts Bar Unit 2. We're part of the division of construction project in Unit 2 with

oversight for all nuclear construction in the USA. And that involves Part 52 plants and fuel facilities along with Watts Bar 2.

So, what I wanted to do was just give you a brief update of the construction inspection program. Kind of where we're at, some of the results and a look forward.

As far as our inspection results, we recently completed the 2012 end-of-cycle review. It's our annual review where we look back on the previous year's performance and judge where we're at as far as our inspection program to make adjustments as needed.

During that review, we noted that overall performance for TVA construction was at an acceptable level.

We held that - that was an internal meeting. We sent the results of that assessment to TVA in a letter.

And then we held a public meeting near the site in April to provide the results to members of the public, hear their feedback and answer questions.

During 2012, we identified 11 non-cited violations. They were all of the severity Level 4 category. And they covered a variety of areas, corrective action, adherence to procedures, design

control, accuracy of information and records.

I guess the bottom line there is really we didn't have any trends necessarily in one particular area, nor do we have any substantial cross-cutting issues which we look at similar to the ROP.

We did at the end of 2012, perform an inspection, a follow-up inspection on commercial grade dedication. And during that inspection, we identified three apparent violations identified with commercial grade dedication.

A pre-decisional enforcement conference was held actually beginning of 2013. And the staff is currently in the process of evaluating the results from the enforcement conference and is yet to make a final determination on that. So, that's still forthcoming.

MEMBER SKILLMAN: Bob, before you proceed, is there any basis to believe that that will lead to an extent of condition grade review than those three apparent violations?

MR. HAAG: There's a history behind there. We've been looking at commercial grade dedication probably for the last two years. This was a follow-up inspection where the three apparent violations were identified.

During the previous reviews, we had been

looking at TVA's extent of condition review. We have done an exhaustive review of the commercial grade dedication problems and how they affected equipment procured for Unit 2. So, we have been looking at that and TVA has obviously been doing an exhaustive review.

As part of this, it's more of a culmination looking at the results, how widespread these problems were, the apparent violations, address them and they were discussed during the enforcement conference.

MEMBER SKILLMAN: As the gentleman said a couple of hours ago, not a whole lot of equipment was purchased for Unit 2. It was either dedicated or it was conformed to be appropriate for Unit 2, because it hasn't idled for many years.

Is the equipment that is in the target of these three apparent violations nuclear safety grade ECCS-type equipment or control equipment?

MR. HAAG: Yes, it certainly was what we focused on was commodities, equipment that was purchased under the commercial; grade dedication program recognizing that program had flaws, and then looking at what TVA was doing to resolve that. Whether it was equipment that had been installed in the plant, they would need to do additional testing to verify what is actually installed in the plant was correct. So, we

had been following up on that.

Does that answer your question?

MEMBER SKILLMAN: Kind of. What I'm really wondering is if there is a greater issue here that we need to talk about, or the region's comfortable that all that needs to be reviewed under commercial grade dedication has been reviewed.

MR. HAAG: Yeah, I would say we are comfortable where we're at right now. They have not done a hundred percent or it was close to a hundred percent review. Was it this month? Nine percent complete.

CHAIRMAN RAY: It's not clear on the record who is speaking or - so, you have to come to the microphone.

MR. HRUBY: This is Ray Hruby talking about commercial grade dedication. We have completed 90 percent of the testing on the components that require testing. And we expect to be completed by the end of June with the rest of the testing.

So far, everything is satisfactory.

MR. HAAG: And that has factored into our review and going forward as far as the decision on how we deal with the apparent violations has been, you know, the extent of testing and the test results.

CHAIRMAN RAY: Well, Bob let me - since you're up here on this subject, I'm going to read you two open items and ask you to comment as to whether they're related at all with what you're doing. It may or may not. I suspect that it should be.

One of them, 16, says based on the uniqueness of EQ, the NRC staff must perform a detailed inspection and evaluation prior to fuel load to determine how the EQ program complies with the requirements of 50.49. And the other one is NRC staff should verify the accuracy of the EQ list prior to fuel load.

Now, that would affect, I would think, commercial dedication. Are we looking at all the stuff we should be looking at? Do we have the environmental qualification parameters specified correctly for purposes of commercial dedication?

So, those are open items. Are they - is this something you have to revisit, or does it adequately address the things you're looking at, at this point?

MR. HAAG: We have not. We've done limited inspections dealing with environmental qualifications. Part of it is because, you know, TVA needs to go to a certain point before we can perform those inspections and complete those open item reviews.

While there may be some ties between commercial grade dedication, the issues and problems we identified and EQ, right now I don't necessarily understand those or necessarily believe that there is a direct tie.

CHAIRMAN RAY: Well, that's interesting because I guess I would think that commercial grade dedication, in my experience, would include attributes required for EQ, not just quality and manufacture or seismic loading or whatever things you are including.

MR. HAAG: Well, part of the follow-up to the commercial grade dedication is TVA verifying that all the items procured under that program actually can't perform their designated safety function.

And whether it's an EQ application or whether it's strength of material, I mean, irregardless they have to verify all those equipment, again, procured under that program can perform their function.

CHAIRMAN RAY: Yeah, of course, but I guess all I'[m pondering here is, to me, commercial grade dedication has to include whatever the environmental qualification requirements are for the item in its service.

And so, I was just trying to figure out as you're inspecting that process now, whether or not it

has to be considered the inspection is only partial because of the status of this environmental qualification matter.

I'd rather assume, no, this is simply an open item because it's not going to get closed until everything is done. And that, therefore, you were looking at the environmental qualification on those items for being dedicated today.

MR. HAAG: I would put it as, as we do the environmental qualification inspections and include those open items, we'll inform those inspections of the problems that were encountered during commercial grade dedication and the results of all of them.

CHAIRMAN RAY: All right, but it's not an easy thing sometimes to do EQ and commercial grade stuff. That's why it seemed to me like it's sort of an important test of the commercial grade dedication process.

Go ahead.

MR. HAAG: Okay. The other point I wanted to make was we also follow up inspections on a confirmatory order associated with falsification records that was a historical issue that we dealt with in 2012 through the ADR process, Alternate Dispute Resolution, and resulted in confirmatory order of TVA taking certain actions as a result of that. And we

followed through with an inspection process.

We continue to inspect corrective action programs using a number of methods. We do annual problem identification resolution inspections. We've been doing those since 2010 and will continue until the end of the project.

We do focus samples. The commercial grade dedication inspection back 18 months ago was a result of that. We noticed some individual problems through our inspection process with commercial grade dedication.

We decided to do a focus -- and that resulted with some of the broader issues being identified.

And I'd say the overall results were somewhat mixed as far as the commercial grade - excuse me - as far as the corrective action program. We've seen through our annual PI&R inspections a varied performance.

Most recently in 2012, there were a number of violations issued identified with some long-term trends in the corrective action program.

And then we performed the follow-up inspection. It looked like things were getting better. And we just most recently performed our annual inspection for 2013 and we're processing that special

report.

So, overall it's, you know, we've looked at the corrective action program very aggressively. We understand. We believe it's an important process and TVA will be able to build a reliable plant and will continue to do so.

MR. HRUBY: Bob, Ray Hruby. I believe we can add some clarifying information on commercial grade dedication and equipment qualification.

CHAIRMAN RAY: Okay. Why don't we wait until Bob is done, and then I'll give you that opportunity.

MR. HRUBY: Okay.

MR. HAAG: As far as inspection resources, I just wanted to give these numbers to kind of give you a sense of what our level of effort has been in 2012.

The numbers were reduced last year, and that was in part because of TVA's estimate completion effort that refocused some of their attention on identifying where they were at with the construction project.

And as a result of that, some of the actual construction work was decreased. So, therefore, our inspections took a corresponding decrease. So, that's what I meant by the second bullet. We had to adjust our inspection efforts based on the level of

construction activities.

We've since - since the last time I talked, we've reduced the number of resident inspectors from four to three.

Like I had mentioned earlier, we had four resident inspector positions. We were filling two of those with temporary rotations.

Again, that was during the time frame when we thought construction was going to - the project was going to be complete in 2012. And it was difficult to send a person out there, relocate them for a year, 18 months.

Since they've extended the project to 15, we have filled a third resident inspector position with a full-time individual. So, we have three full-time resident inspectors out there right now.

In our plan going forward, we are staffed. Our staffing plan shows four resident inspectors at Watts Bar and we'll look at activities for the residents and adjust those. If we need a fourth person, we'll put a rotation out there to accomplish that need.

So, in addition to the resident inspectors, we had 32 different inspections performed in 2012. That's pretty much on par with what we've done before through different regional inspectors going out there

looking at the various categories.

And we continue to have the same level of staffing in my branch in the region. We've got four individuals dedicated to Watts Bar 2 project.

One more recent procurement activity or - was the senior resident inspector for construction has accepted a position at headquarters. So, we're in the process of looking at filling that replacement. And that will be a challenge in that, again, the time frame of relocating someone out there.

We've got several options that we're looking at as far as, you know, to replace that key position.

Next slide. During earlier meetings I had given you kind of the scope of what we're inspecting out there for construction.

We've got all those items included in the inspection planning and scheduling system. I can't honestly recall what we refer to it as. And there's over 540 items, distinct items we want to inspect as part of the construction project.

Where we're at right now in looking at those, we've closed almost 300 of those items. The remaining items we've done some level of inspection.

Or if we haven't, our focus right now is

to ensure we've at least gone out and looked at what TVA's plans are to deal with those areas that we're inspecting such that we can now specify attributes that need to be done.

And many of the remaining items are open because we're waiting on TVA to accomplish a construction task or there is finishing a system, testing a system, installing a particular set of valves, relays.

So, again, many of the remaining inspection items were waiting on an activity to be accomplished such that we can perform those inspections.

I'll make note that allegations, we continue to have a steady workload from allegations. No necessary trends there, but clearly that takes up a good amount of my staff's time as far as dealing with allegations.

I want to go over a little about pre-operational testing and our plans for that. I've mentioned in the past that we had a team leader who was hired into my branch with the specific focus of looking at how we want to address the operational testing, make sure we're prepared for that both from manpower and infrastructure.

Pre-operational testing involves two

separate areas. One is the classical pre-op testing and our inspections of testing actually in-plant. And the other part would be operational preparedness inspections. And I'm referring to our inspection program as designated or defined by manual chapter 25.13.

Again, the operational preparedness inspections goes to typically the programs that we look at to make sure a station is capable of supporting the plant going operational. They would be classical radiation protection, security, EP, things like that.

As far as our preparations, we've got inspectors assigned for all the mandatory and the primal tests.

And as you can see, there are six mandatory tests. And those are really the more integrated, complex tests such as hot functional, RCS hydrostatic pressure tests and loss of onsite power. So, we've got people designated for leading those inspections and they will have to provide support inspection staff during those times of the inspections.

The primal tests are the typical systems tests; AFW, containment spray. We've designated nine systems that we want to look at detailed testing.

Actually, looking at where TVA will be in

performing those tests and turning over safety-related systems, there's a good possibility that we'll be involved in performing inspections of pre-operational testing on possibly six of the systems during this fall/early 2014.

So, again, that goes towards making sure we have proper inspection staff available, plans and that we start doing the up front reviews of procedures at the appropriate time.

In the area of operational preparedness inspections, what we've done there is we've looked at the inspection program as defined in manual chapter 25.13 and we've stepped back and questioned whether we want to do those programs as specified. And let me elaborate a little on that.

There's a list, an exhaustive list of procedures in manual chapter 25.13 for all the different areas.

For example, in security there's probably 15 different inspection procedures that would dictate the staff go out and perform.

We've questioned the validity in doing that given that Unit 1 has been operational since 1996. The security program is in place. Unit 2 is really going to do very little to expand that security program. To

some degree, it will. So, we've questioned how much more security inspections do we want to do specific for Unit 2.

We've come up with a set of recommendations for all the different areas. We've provided those recommendations to the Program Office as far as coming up with an alignment as far as what we need to inspect in these areas for Watts Bar Unit 2, and we're in the process of finalizing that, too.

And what will, in my view, will result in a more limited scope of inspections for these areas with a focus on what's unique to Unit 2 versus looking at programs that have been tried and tested as part of Unit 1's operations.

Then I guess the last part, the last bullet there is really just the recognition that we need to look forward to parallel inspection efforts both continuing with our construction inspection programs, closing out the remaining IP&S items and also performing pre-operational testing -- the team leader in mapping out our resource needs and making sure we have plans going forward to do that.

I mentioned we have lead inspectors assigned. We've also looked at, you know, what are the backup needs as far as supporting tests that are going

to be going, you know, maybe on a three or four-day duration.

We've talked about having some rotations either from folks in the region or other regions gong up there to support pre-op testing. So, we've got a number of ideas on how we want to staff our inspection needs for both those programs.

So, I guess in conclusion I want to make the point that, you know, our construction inspections are continuing. We believe that we've been identifying issues and we're pursuing those to make sure TVA is taking adequate corrective actions.

Commercial grade dedication inspection results will be forthcoming and there will be a set of inspections that we'll need to do as far as follow-up with those.

I mentioned this earlier, but I'll repeat it again. A key part of our success is going to be for these remaining IP&S items, identifying specific activities they want to do and make sure we've got those activities and those inspections scheduled and sufficient resources are available to do that given the fact that we're going to have, you know, competing resources with both other inspection areas for Watts Bar 2, and also competing resources for the open

construction projects within the region.

Any questions?

MEMBER SKILLMAN: I do. Let me ask this question: The experience I've had over the years is that when one finds commercial grade dedication issues whether they're findings or threshold findings, those commonly point to configuration control, configuration management issues. The citation for the violation is Appendix B Criterion 3, Design control.

My experience has been when you begin to pull the thread on that, you find that the design control issue really overflows into configuration control, configuration management and that's the string that Harold was pulling over on EQ.

And so, I'm wondering if this complicated construction, a live unit with a new one being licensed effectively to the current design basis - or current licensing basis of the operating unit, if you have an inspection module for configuration management, configuration control that you might find valuable such that when that module is completed we can say, we are comfortable that Unit 2 is conformed the way it's supposed to, to the design of Unit 1. And then this program SAFE that we talked about, fire protection and other programs like that really do fit together in an

integrated configuration management fashion.

When I see design - when I see configuration control, configuration management issues, I'm always thinking about mini mods - larger modifications that may have missed some arcane design feature that might be important, I think, if commercial grade dedication where you actually have vendors that are not in business anymore, but you need the kind of equipment that they once provided. So, you've got to go and find another piece. And then you've got to do a piece part dedication for the functional performance of the device that you're replacing.

So, I'm wondering, Bob, if your team is envisioning perhaps configuration management, configuration control review as part of your - if you will close out as you begin to look at the end of this construction program.

MR. HAAG: We have looked at configuration control or design control, because it is part of the 2512 inspection program. There are a number of inspection procedures that would get you to look at that.

We've also done some focus inspections under fuel change process. Make sure that changes from the design where they've had to go out as they're installing the plant, they have to go back and, you know,

change things because they couldn't be installed as designed.

We have looked at the programs, and for the most part we found those acceptable and continue to look at those.

We have an inspection scheduled in 2013, again, to look at field change requests, design control.

And then I guess I'd add also another part is our as-built verification process. We've got inspection procedure require us to look at as-built, you know, making sure the plant is actually built as it was designed in two different locations; 2512 as an as-built verification inspection effort, and 2513. That's a similar one.

Distinct them in how - in the level of detail and the scope of them, but both of them look at as-built design.

You're right. The commercial grade dedication issue did result in looking at us as far as design control, but there was some fundamental problems with the way TVA had gone to dealing with commercial grade dedications. And I don't have all the expertise to talk about that, but it was a critical characteristics and how they identified those to be then verified once the items were procured and, you know, brought to the

plant. So, yes, it was a design control issue.

But as far as your classical design, you know, you've got a design, you know, for your calcs or your - I have to say and how you translate that into the plant and make sure it gets included may be a little bit different.

CHAIRMAN RAY: Thank you. Is that it? Anymore from you guys?

MR. HAAG: That's all I had as far as the presentation.

CHAIRMAN RAY: Okay. Fine. Now, before they leave, you said you might add something on environmental qualification relationship to -

MR. HILMES: Yes. Steve Hilmes, Electrical I&C. Keep in mind we talked about earlier that we had to have Cat 1 qualification on components.

I can't think of a single location where we would be commercially dedicating anything from an environmental qualification standpoint from an EQ standpoint.

CHAIRMAN RAY: Well, that's, I guess, a great outcome, but isn't anything that's necessarily going to, you know, it isn't a result that necessarily applies.

You might have commercial dedication of something that needs to meet the environmental

qualification requirements, but you're saying that's not the case.

MR. HILMES: Not for a harsh environment, no.

PARTICIPANT: I was going to say you're commercially dedicating some of your digital I&C stuff, I would assume.

MR. HILMES: That is correct.

PARTICIPANT: But that's all mild environment.

MR. HILMES: That's 50.49 generally. I mean, if it is like our couples, those are purchased from Westinghouse has already called about it.

PARTICIPANT: You don't have any digital signal processing stuff in your containment?

MR. HILMES: No, we do not. That is part of EQ as well.

PARTICIPANT: Okay.

CHAIRMAN RAY: Okay. Thank you for that. And with that, we are going to adjourn for lunch. We have another meeting during the noon hour. So, I'm going to ask that we resume at 1:15 rather than one o'clock.

(Whereupon, the proceedings went off the record at 11:59 a.m. for a lunch recess and went back

on the record at 1:14 p.m.)

A F T E R N O O N S E S S I O N

1:14 p.m.

CHAIRMAN RAY: We're back on the record. We're going to pick up now with staff discussion on Watts Bar.

But before doing so, let me pass on some information as a result of our meeting that we had that caused the start of this meeting to delay. It was a planning meeting and we have to meet with the Commission in July.

Things are getting moved around a little bit and there are a couple of things that we have - that are high priority that we have to do in addition to meet

with the Commission, for the Commission.

The upshot of it is that we're not going to be able to schedule enough time with the full committee in July for us to then write a letter in July. It just can't be done.

The most logical thing for us would be to defer meeting of the full committee until later, as well as the letter has to get delayed.

But I want to establish the opportunity, at least, and again we can talk about this at the end of the day when we were planning to, but I wanted to put this on the record, we could if there's a good reason to do so, have a - I'll call it a preliminary full committee discussion perhaps just with the staff to talk about the process that the staff is following, for example, in its review and the way in which one would describe some of the things that I discussed here in the form of questions today.

So, I want to leave that possibility and let you consider it, Justin.

MR. POOLE: All right.

CHAIRMAN RAY: It's not to say we couldn't meet with the applicant also, but it's very limited time.

And it's just not practical based on that meeting with the full committee, because all letters

are full committee letters. There is no such thing as a subcommittee letter.

And it's just not going to be practical for us to do what needs to be done in July and then also write a letter in July.

So, for that reason, we're going to have to schedule at least a portion of the full committee meeting until later. Although, we do view it as a high priority and you can see on our workload list here it's a high priority.

The problem is we've got too many high priorities in July. And so, we'll need to at least schedule part or all of the full committee briefing.

I am going to be discussing with the full committee tomorrow - or Thursday, excuse me, this task that we have to write an interim letter and get some more input from them about what issues the full committee wants to address that - at that briefing.

So, that's the status, anyway. I can just tell you now for sure the letter is not going to be able to be issued in July. And at most, we would be able to perhaps squeeze in an hour if there's a good reason to do it, and there may be, from your standpoint or our standpoint.

I've just got to talk to the full committee

when I have a chance to do so on Thursday and discuss with them, because I'd rather that they not get hit cold or without some opportunity to have thought about this and asked questions about it, because it is an unusual process that we're going through.

MR. POOLE: Sure.

CHAIRMAN RAY: And then get into the details rather than get into the details and be telling people, oh, you can't ask that question or that's out of line, you know, whatever, because it's a unique circumstance that we're facing here.

So, that's the status. And with that unless you have a question, Justin, we could talk about it further off the record after today's subcommittee meeting.

MR. POOLE: Sure, or - yeah. Like you said, even at the end of the presentation we talked about planning for upcoming meetings and -

CHAIRMAN RAY: All right. So, with that, let me turn it over to you.

MR. POOLE: Okay. Thank you. As I said before, my name is Justin Poole, the project manager for Watts Bar Unit 2 and NRR.

Right now I'd like to go over - do a presentation on - give you guys an update of where we

are with the licensing review and licensing activities.

When TVA came in with the project, they started off with Amendment 92 to the FSAR, which was basically a markup version of the FSAR that existed at the time Unit 1 was issued.

And then since that time, has supplemented it over the years. So, currently we're up to Amendment 109.

To go along with that, the staff has been doing their evaluation of the information in the FSAR and we have issued supplements 21 through 26 during that time to document the staff's review.

SSER 21 didn't contain any technical information or technical review information. It was the document in which we kind of laid out the framework of how we were going to do the review and then which sections we thought the review had already been closed based on previous SERs and essentially no changes to the design, and then which ones the staff needed to go back and look at or complete the review in because it was never done for Unit 2. Although, it was done for Unit 1.

So, as you can see here, there's a list. We listed the different chapters that were - major portions of the chapters that were done in each

individual SER.

And of course you know there was a subcommittee meeting that followed each one of the publications of these SERs.

The one that we're talking about today is SSER 26 and the major component of that is being the fire protection review.

The remaining areas to be reviewed by the staff is essentially a closeout of all the open items that are existing in Table HH.

CHAIRMAN RAY: There's quite a bit of material on SSER 26.

MR. POOLE: Yes, sir.

CHAIRMAN RAY: In other matters.

MR. POOLE: Correct.

CHAIRMAN RAY: As well as fire protection. And the fellow who is chairing the meeting next door, for example, is having to review that carefully. Also, the Chapter 7 stuff, for example.

MR. POOLE: Correct.

CHAIRMAN RAY: And I think the way you explained it just now seems like, well, this is straightforward enough. But then to use the example of boron dilution, for instance, you know, you say, well, is that an exception to the rule or is there some reason

why it was handled the way that it was on Unit 2?

I heard the explanation from TVA, of course, but it's those kind of things that have to get sorted out so that people don't feel like they're being misled about what's on the table and what isn't.

MR. POOLE: Understood. I think there are-

CHAIRMAN RAY: Okay. If you understand that, you understand my dilemma.

MR. POOLE: Yes. And I think there are those circumstances like you point out with boron dilution, I think they are the minority, but there are a few of those.

CHAIRMAN RAY: Yeah. And so, somebody might say, well, wait a minute. I've got one, too. And so, I get stuck at that point. So, that's why we need more discussion to try and make sure everybody is satisfied that these things are off the table that you'd like to pursue, but there are some other things that have been put on the table.

MR. POOLE: Well, yeah, and that's a good point. Because in talking about the open items, we, you know, if you remember the last subcommittee meetings which was in December of 2011 -

CHAIRMAN RAY: It's hard to remember that far back, but okay.

MR. POOLE: We all sat here and we went through - the members that were here for the subcommittee went through and pointed out which of the open items -

CHAIRMAN RAY: That's right.

MR. POOLE: - that the staff needed and, TVA needed to come back to you guys and present how we closed out that open item.

But you're right. The SSER 26 contains a lot more in there, you know. There was a number of open items that we closed in SSER 26 that were not on, you know, that list of eight.

CHAIRMAN RAY: That's right.

MR. POOLE: Boron dilution was the only one. So, going before the full committee they may say, well, you know, I was interested in Open Item 82 or, you know.

CHAIRMAN RAY: Well, or I've got another issue to state the thing like I was trying to parse out Fukushima. How did we deal with - we deal with some generic issues here. Those, I believe, we're not dealing with within the scope of our interaction with the SSERs, for example.

MR. POOLE: Well -

CHAIRMAN RAY: Or tell them about it.

MR. POOLE: Yeah.

(Laughter.)

MR. POOLE: So, our plan actually was - correct. We did not plan at this point to include the evaluation that the staff does as part of the review of the response to the orders in our SSER.

CHAIRMAN RAY: Right.

MR. POOLE: But as it is one of the precursors, if you will, to issuing the operating license, we did plan to have a presentation before the subcommittee and - whenever that next subcommittee meeting might be.

And at this point - and we'll talk about that later. We're thinking it's probably about a year from now based on the way other reviews are going, but - so, it wouldn't get documented in our Safety Evaluation Report or supplement to the Safety Evaluation Report, but we did plan to present how the staff closed out this item, if you will.

CHAIRMAN RAY: Well, that's fine. Again, that's what we're talking about here is how we're dealing with this kind of unique situation. That's what you're proposing. I just need to sell it to everybody on the Committee.

MR. POOLE: Understood.

CHAIRMAN RAY: That's where we are.

MR. POOLE: So, again, the main thing that the staff is focusing on is - from the SER review is closing out the open items that remain in Appendix HH. The main one of that being Chapter 2.4, hydrology.

TVA kind of already went over earlier the status of that, but just so you - just to kind of reiterate real quick, you know, we went before the Subcommittee. I think that was the October subcommittee, maybe, on hydrology. And you guys brought up a number of very good questions that forced the staff and TVA to go back and relook at what was done.

TVA has now submitted a new analysis and the staff is - in the form of a license amendment request for Unit 1 as it is a site issue.

And the staff - and along with that, that's actually - part of that is in Amendment 109. They - while they sent in the licensing amendment application for Unit 1, they supplemented - the Unit 2 supplemented their FSAR application in the form of Amendment 109 to match the license amendment and the staff is currently reviewing both of those.

And that is the major driver for the next - when we have the next subcommittee meeting.

CHAIRMAN RAY: Okay.

MR. POOLE: So, again, looking at - this is

kind of a hold-over to the last subcommittee meeting where we kind of went over in detail the status of all the open items. So, I just wanted to give an update again of where we are with that.

There was 128. Although, the numbering is a bit different in the table, because there were some that were never used.

As of SSER 26, 75 of those are closed, which leaves 53 to remain open. But if you recall, there's two categories as either confirmatory items or true open items.

So, when you break it down from there, there are essentially 33 of those are confirmatory - excuse me - and the remaining 20 are open items that the staff still needs to complete their evaluation.

TVA earlier, I think, said the number of ten. The difference in that is how you count the beans.

We are counting that we haven't issued the SE yet for those 20 items. I believe they are counting in the number that they haven't submitted the information to us yet.

MEMBER RYAN: All the beans add up.

MR. POOLE: All the beans still add up, yeah. Everyone is keeping track of the same beans, but it's just how you do it.

To kind of talk about how we in the Project Office make sure to kind of talk to some of the questions that you have about consistency and impact of what we do on Unit 1 impacts what happens on Unit 2 or vice versa, just so you guys - just to lay out our - how we administratively try to control that is the project manager for Unit 1 and the project manager for Unit 2 are both underneath the same branch chief. They both fall within the same division management and we're the designated backup for each other.

We attend almost the same meetings. When TVA has a status meeting on the Unit 1 licensing actions, both of us will call in. And the same thing when we do the Unit 2 status in meetings, including when we have the meetings with the region.

So, we try to keep each other up to speed with everything that's been going on. And that's to ensure that when reviews are being done that affect both plants, that they be done consistently.

A lot of the licensing actions that Unit 2 - or, I'm sorry, that Unit 1 has in-house with the NRC right now to update their licensing basis, are actually as a result of our review on Unit 2.

So, Unit 1 is kind of catching up to what Unit 2 has already done. So, in having that

communication with the two PMs, we can ensure, you know, items that were discussed in the Unit 2 are carried over when the Unit 1 review is done. We can assign the same reviewers to the task for efficiency and for consistency reasons.

And then the other thing is that at some point Unit 1 - TVA said that Unit 1 will freeze all changes to the licensing basis of Unit 1, which I believe is this fall, roughly, so that there will be no more changes to the licensing basis of Unit 1 moving forward from that time to help minimize, like you said, trying to chase a target around.

And then the only other part that I have was just to reiterate we published SSER 26 in May/June. When we have the hard copies, I'll give - the publishing office has been a bit backed up. So, when I have physical hard copies, I'll give them to Mr. Shukla.

MR. SHUKLA: We don't need that.

MR. POOLE: Oh, okay. Understood.

And then the two topics that we intend to talk to you today in the SSER 26 is the closure of Open Item 132, which was boron dilution analysis, and the fire protection report review.

So, if there's no -

MEMBER STETKAR: Yeah, there is.

MR. POOLE: Sure.

MEMBER STETKAR: Now, I didn't do this this morning in the interest of time. One of the items that was closed in SSER 26 related to the emergency gas treatment system.

And you probably don't have anybody here to support this, because it wasn't on the agenda, but that's okay.

MR. POOLE: Okay.

MEMBER STETKAR: And I hadn't looked at the system beforehand, but I decided to when I saw this, it's, you know, it's a completely shared system between Unit 1 and Unit 2.

And the question that I had and TVA might have an answer to this, is it seemed that it's possible to transfer gas from one unit to the other unit's annulus through this system unless there are specific interlocks that prevent that from happening.

And I looked and I, you know, I couldn't find anything in Chapter 7. I couldn't find anything in - anything that described how the system worked about anything that would prevent that. So, I was curious whether you guys or you folks looked at that.

It wasn't part of this particular open item, because this open item had something to do with the flow

rates. But to understand the flow rates, I had to go look at the system.

And in the FSAR, actually in FSAR Amendment 109, it still states that it's isolated with lock-closed isolation valves from Unit 2, but I suspect someday those valves are going to get unisolated.

And then the question is, can you actually transfer, you know, if you're taking a section from the Unit 1 annulus, can you transfer things over to Unit 2?

Especially because the system is designed to recirculate some of the flowback so you can actually get a flow path unless there is some interlocks.

Is that a concern? I don't know, but it's a question of did someone - when you start thinking about these interunit interactions, did somebody take a look at that?

MR. POOLE: I can't speak to that. I'll have to get back to you. I don't know.

MR. KOONTZ: We can address it from the TVA perspective. This is Frank Koontz, TVA. There is possibilities for that to happen.

We have considered that and we're looking at it even as we speak. But the particular modes that we're concerned with is where we're testing on the

non-accident unit. We have to have EGTS training and test on the non-accident unit. And then we have an accident over in the other unit of what might happen with the gas transfer between the annulus as -

MEMBER STETKAR: So, you're actually looking at it.

MR. KOONTZ: We've modeled the entire system using a computer code called Arrow. And we're looking at that right now to see how that gas transfer occurs and whether we have to do some automatic isolations or some manual isolations.

MEMBER STETKAR: Yeah, I've looked for automatic signals. But, you know, that type of thing isn't typically -

MR. KOONTZ: Right. Now, it turns out that because it's dual train, it is possible to have one unit in test and the other train in non-test, and it will handle the -

MEMBER STETKAR: No, no, I can see how you can line it up manually to make it work.

MR. KOONTZ: Correct.

MEMBER STETKAR: But I was thinking in terms of automatic decisions.

MR. KOONTZ: That's one of the things we're looking at right now.

MEMBER STETKAR: Okay. Thank you.

MR. POOLE: Okay. If nothing else, I'll turn it over to Chris Jackson for the discussion on the boron dilution analysis.

MR. JACKSON: Good afternoon. My name is Chris Jackson. I'm chief of Reactor Systems Branch. I started here in August of last year. My technical reviewer, Sam Miranda, is on vacation in Europe and he's happy that I'm filling in for him.

CHAIRMAN RAY: So, you got stuck with it, huh?

MR. JACKSON: I know. It's poor planning on my part to really allow my staff to go on leave, but there are certain things you have to do.

So, if my understanding is correct, this was an open item two years ago. The last year actually before I became branch chief, we issued the SER and closed this out. So, this has been addressed by the utility and closed out internally, you know, pending our discussions with you all.

Go to the next slide. So, Reg Guide 1.70 Revs 1 and 2 only address a boron dilution event in modes 1, 2 and 6. Subsequent revision of Reg Guide 1.70 requires all modes be considered or recommends all modes be considered. We believe the licensing basis is - for

Watts Bar Unit 2 is Revision 2, which would direct them to address this in all modes of operation.

We've captured this as an open item and they've subsequently addressed it. Obviously, we're trying to protect GDC 10, 15 and 26 with regard to this. And the whole purpose of the analysis is to ensure that there's adequate instrumentation and annunciation for operators to take action and then that there be appropriate time for them to do that.

Go to the next slide. So, what they've done is they've added an alarm on the volume control tank as protection on Modes 3, 4 and 5.

We've used very conservative charging letdown rates and we've determined that in Modes 2, 3 and 4 they have - sorry - 3, 4 and 5 they have enough time before they had addressed Modes 1, 2 and 6. And we are satisfied that they meet the current revision of Reg Guide 1.70 which was published in 1975.

MEMBER STETKAR: Chris, did you ask them on those very conservative charging of letdown rates about the low-pressure letdown configuration that I mentioned this morning?

MR. JACKSON: I don't think so. We, you know, based on your question this morning, we - I took a quick look at it.

I haven't been able to go through it all but when you're dealing with the timing issues, obviously if you have lower letdown it would get to the alarm setpoint a little slower.

So, it would take more time to get to the alarm setpoint, but you would still have time before you lost -

MEMBER STETKAR: Depends on the letdown flow rate.

MR. JACKSON: Right.

MEMBER STETKAR: If it's 48 GPM, you get to your magic 15 minutes. If it's 33 GPM, you have five minutes. If it's less than 28 GPM, you have zero minutes.

So, any letdown flow rate less than 28 GPM under the boundary conditions that they set up doesn't - gives you zero time margin.

MR. BRYAN: And if I may, this is Bob Bryan, we did take a look at that. A couple of things. When you look at TVA's operating procedures for the - when you're in the shutdown modes, they direct the operators to maximize the charging - the letdown rate, excuse me, to facilitate cleanup of the RCS.

And while it is theoretically possible to have a 45 GPM letdown rate, that is a very unlikely

scenario the way the procedures are set up.

So, we chose to analyze this using a conservative letdown rate relative to how we expect to operate the plant.

We did go in - since we don't specifically exclude letting down only using the 45 GPM orifice, we didn't go in and look at those conditions. And in Modes 3 and 4, the analyses showed that you had more than 15 minutes even so.

In Mode 5, if you did it straight up using the same assumptions we used in the other part of the analysis, you would not have 15 minutes. But when you're in Mode 5, TVA also invokes procedurally another step that requires them to provide additional boration in advance of that.

And when you account for the additional boration that we do employ in Mode 5, once again you have basically the amount of time that's listed on the slide.

So, we believe we've technically addressed the issue and we think that's sufficient given the very unlikely state of being in that configuration.

MR. JACKSON: So, when you choose your safety analysis, you balance it. You don't want a crazy plant configuration. You want a representative one.

So, if they were in an alternate plant configuration, you would see - have other indications. So, they've chosen to analyze it this way. We're satisfied if -

MEMBER STETKAR: It's simply a question that your safety evaluation states that the letdown flow rate of 75 GPM is, quote/unquote, conservative. And indeed it, I don't believe, is necessarily conservative, because we've heard today that TVA has perhaps procedural guidance in place such that if the letdown rate as I'm understanding it is less than that, maybe they're at a higher boron concentration, so perhaps you can make the analyses balance.

It's just, you know, I want to make sure that we have regulatory assurance that what they have in place will protect against that event in - according to the regulatory guidelines.

If you need more than 15 minutes, you need more than 15 minutes.

MR. JACKSON: Well, I guess I'm - if you have a letdown less than 75 GPM and then you start ejecting, you'd see indications in the pressurizer.

MEMBER STETKAR: You know, they didn't take credit for that.

MR. JACKSON: No, no.

MEMBER STETKAR: This is a deterministic licensing analysis. It is not a probabilistic analysis. It's not a risk-informed analysis. It's not performance-based. It's a deterministic licensing analysis.

MR. JACKSON: That's true.

MEMBER STETKAR: So, you establish - that's - you live by the rules, you die by the rules.

MR. JACKSON: Right. But when you establish, I mean, what's your safety analysis to consider? You want a conservative value.

MEMBER STETKAR: You do want a conservative evaluation.

MR. JACKSON: But it's difficult at times to come up with a conservative one which doesn't become extremely unlikely or -

MEMBER STETKAR: Well, my whole point is how unlikely is it? You know, my initial question was what assurance do we have that indeed the 75 GPM during Mode 5 is a lower limit for the letdown that you would expect.

And we heard this morning that, indeed, there seems to be procedural guidance to provide some assurance that that is the case, but I'm not entirely, you know, I ask for the - I asked to see the procedures that provide that guidance.

MR. JACKSON: Okay.

MEMBER STETKAR: And from a regulatory perspective, it's not clear to me that you asked for that.

MR. JACKSON: I don't believe we did.

MEMBER STETKAR: Okay. That's the only point I'm trying to challenge here is did the analysis that was performed actually provide an appropriately conservative bound for reality.

And I'm not trying to get into, you know, very, very rare types of alignments that plants might get into. I'm actually thinking about the normal configuration when you're on RHR where you do have the low-pressure letdown line in service and, you know, the letdown flow rate is basically determined by the operator wherever they set the letdown - low-pressure letdown flow control valve, because the valve you adjust manually to set that flow rate.

MR. JACKSON: That's correct, but they presented this as a conservative value based on their procedures.

They didn't tell us that it was a value that, you know, that it couldn't be violated under, you know, some other scenario.

So, the way they presented it was this is

the way they operated their plant.

MEMBER STETKAR: I was just curious that the same letdown flow rate was presented as conservative for all operating modes knowing that the low - when you're at full-system pressure, there is an orifice that limits the smallest flow rate. You get 75 GPM out of it. That is, indeed, at normal operating temperature and pressure, the minimum letdown flow. That's sort of dictated by hydraulics.

The hydraulics don't apply when -

MR. JACKSON: That's correct.

MEMBER STETKAR: - you're, you know, in Mode 5. It's wherever the operator sets the letdown flow rate. That's procedural with the guidance.

MR. JACKSON: They owe you some information, I believe.

MEMBER STETKAR: Yes.

MR. JACKSON: And we'll evaluate that when it comes.

MEMBER STETKAR: Okay.

MR. JACKSON: Good point. Thank you.

MR. POOLE: There's one more study. I think you already talked about -

MR. JACKSON: I think we covered these.

MR. POOLE: Yes.

CHAIRMAN RAY: Okay.

MR. POOLE: Are there questions on anything else?

MR. JACKSON: Thank you.

CHAIRMAN RAY: I think we understand it.

MR. POOLE: The next portion of the staff's presentation will be on the review of the fire protection report. Chuck Moulton and Dan Frumkin from the staff are coming up for the presentation.

MR. MOULTON: Good afternoon.

CHAIRMAN RAY: Afternoon.

MR. MOULTON: My name is Chuck Moulton. This is my associate Dan Frumkin from the fire protection branch in the NRR. We're going to talk about our fire protection review today.

This first slide is basically the agenda. And it's essentially a list of the slides to come in the presentation.

First we're going to discuss review guidance. Then I'm going to discuss some differences between the initial SSERs and the current safety evaluation. We're going to talk about a couple topics requiring significant interaction with the licensee.

Then we're going to get into operator manual actions, multiple spurious operations and then we're

going to close with a list of implementation items from our review.

So, I think we're all familiar with the SRM the Commission gave us. Basically use the Unit 1 licensing basis as basis of our review for Unit 2. And that's why I've listed 1995 SSERs as also review guidance since they covered a lot of items from the fire protection program such as administrative controls and fire brigade and that sort of thing already.

And then since we were using the early Unit 1 license as the basis for our current review, we decided to use as much of the guidance that was applicable to Unit 1 as we could.

This mainly turned out to be a Branch Technical Position from 1997 that a lot of the SSERs 18 and 19 based on.

Now, when we had a topic that wasn't covered in the BTP or in 1995 such as MSOs or more in-depth evaluation of manual actions, we used our current guidance in the current Reg Guide 1.189 Revision 2.

MEMBER STETKAR: Before we get into some more details, I wanted to ask you sort of a general question from the staff's perspective - well, mostly a couple.

This is not a risk-informed fire protection program. It's a deterministic fire protection program

and you evaluate that according as you said there, to Reg Guide 1.189 Revision 2.

And yet as I read the fire protection report and the SER, I see numerous statements regarding incredible fires, not credible fires, very low probability of a fire, administrative controls for transient combustibles and so forth. Those words sound to me like frequencies which sound to me an awful lot like risk-informed.

How do you reconcile those statements?

MR. FRUMKIN: This is Dan Frumkin of the staff. Watts Bar Units 1 and 2 and all the post-`79 plants are not exactly what I would call deterministic plants as much as, to a large extent, performance-based plants.

They don't - as TVA pointed out, they're committed to Appendix R, but they're not - they don't require exemptions from Appendix R. They have a lot more flexibility than a deterministic plant. There's no assumption of full area burnout. They have flexibilities in that way.

One application of - so, we do have a lot of useful information from risk information. And we've applied that in a performance-based manner to Watts Bar 2.

So, to give you a real specific example with regard to operator manual actions, NUREG/CR-6850 which is our risk-informed guidance, has bins for certain kinds of fire initiators.

6850 has determined that certain fire initiators are incredible. And TVA in their application, has applied that information in a performance-based way to say we have these components type within a fire area. And, therefore, this is - and we have the team that I think may be one of the words that you quoted was incredible.

And the staff looks at that. We have smart engineers who have worked on 6850. We - and we feel comfortable applying that as to a performance-based plant.

MEMBER STETKAR: Thanks. And it's a good lead-in. Two follow-up questions. In the Unit 2 containment, because I didn't look at Unit 1, there's a room called 2RIR, the Unit 2 reactor instrument room.

And I'll quote you a statement out of the fire protection report. The combustible loading is classified as insignificant for a severity of three minutes and is due to small quantities of lubricating oil in control valves and plastics associated with small control panels and to I&C cabinets, a telephone and

junction boxes.

And as concluding statements, none of these combustible materials are associated with a credible ignition source. There are no credible ignition sources in the room.

In NUREG/CR-6850 Bin 15, includes electrical cabinets. Electrical cabinets specifically in NUREG/CR-6850 include instrumentation and control system cabinets low voltage. Voltages of the order that they use here at Watts Bar.

In risk-informed fire protection program transition analyses, electrical cabinet fires are a very significant source of fire frequency and risk. So, I'm curious why a room that contains two I&C cabinets has no credible ignition sources and why the staff accepts that.

MR. FRUMKIN: Well, our judgment on that was based on the licensee's description and application of NUREG-6850. So, if they've misapplied 6850 in that case -

MEMBER STETKAR: Well, they do have a list of what they call incredible ignition sources. And those are motors of less than five horsepower and two or three others. They don't exclude I&C cabinets.

MR. FRUMKIN: But they didn't include it on

that list.

MEMBER STETKAR: I only know what I can read.

MR. FRUMKIN: Okay.

MEMBER STETKAR: There are other - how do you treat administrative controls of transient combustibles?

There are many statements in the fire protection report that says transient-initiated fires are not credible or very unlikely or whatever the words you can find, because TVA has procedures for the controls of transient combustibles.

The staff's review of at least fire analyses that are performed for risk-informed applications, the staff has not accepted the use of administrative controls to eliminate or preclude transient combustible fires.

The staff's position is that the allocation of transient combustible fires and the frequency of transient combustible fires accounts for typical administrative controls that are in place at every plant in the country and yet they still occur.

Now, my question is during your review, have you actually accepted the notion that a particular area has no transient combustibles, in other words, no quote/unquote credible ignition sources due to the fact

that TVA has administrative controls.

And if that is how do you reconcile that with the risk-informed folks who won't accept that notion.

What I'm trying to do in a risk-informed basis, something that's more realistic than the deterministic - excuse the word - but theoretically bounding analysis that's done under an Appendix R-type fire analysis.

MR. FRUMKIN: Well, my recollection of the transient type features that - at Watts Bar is, for example, in the, like, containment, there is areas that are inaccessible during operation.

MEMBER STETKAR: And that's fine.

MR. FRUMKIN: And then outside of that there is, I believe, if my recollection is - there's two levels of transient controls. And I recognize that in risk-informed space there is always that possibility of a - or that credible - some possibility of risk - of transient fire.

But in these events, the reviewers did not see that as significant enough to merit the challenge.

MEMBER STETKAR: Then why in a more realistic risk-informed analysis are people identifying transient combustibles and the allocation of those combustibles

according to staff guidance as a significant source of risk?

MR. FRUMKIN: My -

MEMBER STETKAR: You know, my point is that a risk-informed approach is supposed to be more realistic. An approach where Appendix R is supposed to be more conservatively bounding.

And if, indeed, the Appendix R-type analyses are allowing Appendix R-type licensees more latitude because of qualitative judgments about the allocation of transient combustibles to areas that would not be precluded under a more realistic risk-informed basis, that doesn't seem consistent. Doesn't seem fair.

Seems like we're penalizing people who want to do a more realistic analysis compared to people who don't want to do that realistic analysis.

And areas - I'm not concerned so much about the containment for transient combustibles, because it's difficult during operation. They're big, open floor areas in the aux building where they invoke the no transient combustibles. Areas that contain, You know, all five component cooling water pumps and a couple of aux feedwater pumps.

There's a big area in the ERCW building

that's got switchgear for all of the ERCW pumps with a couple of transformers in there - at least one - I'm assuming there's two transformers in there. I didn't actually do the body count - where they've also invoked no transient combustibles, or minimal, or incredible transient combustible fires.

And I'm really curious about this, because I don't understand why we're penalizing one set of plants that have made a decision to go one direction in terms of their fire protection program and not allowing them to invoke procedural controls, administrative controls and so forth for transient combustibles where we are apparently allowing other people who don't do that type of analysis, that type of flexibility.

MR. KLEIN: John.

MEMBER STETKAR: In other words, why don't we have a design basis - I, Alex. Why don't we have a design basis transient combustible loading in every location for an Appendix R plant and characterize that transient combustible loading as it's characterized in NUREG/CR-6850 with a particular heat release rate.

And if you need to do fire modeling about, you know, what target sets could be damaged from that transient, that's fine. Bar modeling is certainly allowed under 1.189 Revision 2.

Hi, Alex.

MR. KLEIN: This is Alex Klein. I'm the NRR fire protection branch chief. I think you mentioned very good points in terms of the apparent disparity, perhaps, between the two approaches with a deterministic approach that we're using under Watts Bar versus the NFPA 805. And certainly NUREG/CR-6850 has a lot of data in there about combustibles and so forth.

I think the way that deterministic plants use the language that we use in the SC, you use words such as - we use words such as credible, incredible, things like that.

And Dan and Chuck can help me fill in some of the details, but I believe you look at it in a qualitative way, but we may be using the terms not necessarily meant to be a quantitative type of a definition when we say "incredible." There's no number associated with it, because it's not a risk-informed as you point out.

In addition, in both programs and one of the points that I do want to make is even with a conclusion by the staff that either transients are incredible or ignition sources are incredible, the staff also looks at it with respect to defense in depth.

So, in other words, they don't base - they

don't base their decision solely on the fact that the licensee told us it's incredible to have combustibles and transient combustibles in this area.

The staff also looks at the other aspects of defense in depth and looks at the balance of all that.

Now, we do the same thing in NFPA 805, but we do it in a quantitative way. Here we do it in a qualitative way, but we still balance defense in depth in both cases.

MEMBER STETKAR: And I understand that, but there are some locations - this is a two-unit plant with a large number of two fully shared, fairly important systems like ERCW and CC - component cooling water, for example.

And in those cases, arguments about defense in depth in many cases revolve around what are the vulnerabilities to a particular type of size or location of fire.

If I can somehow take out all of my ERCW pumps, all of them with a single fire, I might have a vulnerability. The challenge is many layers of defense in depth.

And because of that, qualitative judgments about the incredibility or without getting quantitative the low likelihood of a fire don't necessarily need to

a lot of confidence.

Fire modeling perhaps if you, you know, went in an did that, which is allowed, you know. 1.189 allows fire modeling as part of the basis for your conclusion that you have adequate protection, in a sense, because of spatial separation and the geometry of a particular location or the potential size of a fire from the particular ignition source.

And I'm just trying to challenge to see how far the staff probes that, because I know in the NFPA 805 world they probe it very, very deeply.

MR. KLEIN: And I'm well aware of -- but, again, you know, both Chuck and Dan can correct me. But I believe that when the staff looked at the information provided to us on the docket by the licensee, they used their judgment in a way also in terms of, okay, they understand these plant areas, they know what it looks like. I believe that they've done some walkdowns in these plant areas.

So, you know, it's not just based upon what the licensee told us. It's also the eyes that they laid on the plant itself. And collectively with that information, staff used some judgment in terms of is it reasonable what the licensee told us? Can we agree with their conclusions?

MEMBER STETKAR: Okay, thanks.

MR. MOULTON: The next item is differences from the first SSER. The obvious note is enhanced or new review topics being operator manual actions and multiple spurious operations as two obvious items.

And then there was a reduction in level of detail contained in the SE for a couple items. First, electrical raceway fire barriers, the Thermo-Lag and fire barrier penetration seals. That's really all I have to say on that unless you have a question.

The next item is topics requiring significant interaction with the licensee. There is fire water system design, internal pipe corrosion in the fire water system and then fire protection report summary Table 1 when we worked with the licensee to add a number of enhancements to get it to the state that it is in today.

MEMBER STETKAR: There were in terms of fire water system design, I came across a few examples where it seemed like either the design or the operating configuration of the system did not support periodic flushing.

There are statements that in the interest of time I'm not going to search through all of my notes here, but there was one location where I recall that

said, well, you can't flush through a drain line because we can't get rid of the water from the drain line.

There are a couple of other locations that said, well, we're going to keep - we have a strainer on the inlet for a pre-action system, and that strainer satisfies the requirements.

There's another example that says, well, we keep the manual isolation valve for what otherwise would be, I guess, a wet pipe sprinkler system closed and it would give indication of a fire if somebody goes down and open up that isolation valve and then the fusable links melt and the sprinklers go off.

In all of those conditions, it doesn't sound like they're planning to do periodic flushes of the systems to see whether or not they have corrosion buildup, whether they've got sedimentation, whether they've got examples of things where I've seen photographs of small bore sprinkler lines in short or so that are 75, 80 percent clogged with corrosion.

Have you looked at that and thought about that? I'm a big fan of flushing sprinkler lines, because it's kind of nice to know whether they're open when you're going to need them.

MR. FRUMKIN: So, and I'm not a big fan of flushing sprinkler lines.

MEMBER STETKAR: Okay.

MR. FRUMKIN: Sprinkler lines in particular. Because in a building such as this that doesn't - that the sprinkler lines seldom get flushed as opposed to a nuclear power plant, you find that the internals of the piping does not degrade after time. As soon as the oxygen is depleted, it lasts - the pipes don't really degrade much at all.

But to answer your question about the overall fire protection fire main system, every plant has a unique fire supply system. Watts Bar is more unique than most.

Watts, part of the difficulty in flushing the systems is that the fire loop, what we can call the iron loop that goes around the plant, that has fire hydrants and can be flushed.

The remainder, the safety loops are in fairly constant usage, so, as part of their safety systems. And so, the status of those is managed.

Actually, we brought TVA in. They had their safety people - safety pipe corrosion people come in and explain to us how those are managed.

MEMBER STETKAR: And just to make sure I understand when you say safety routes, you mean things where fire protection serves as a backup for -

MR. FRUMKIN: No.

MEMBER STETKAR: No.

MR. FRUMKIN: No. This is - what I mean by - so, Watts Bar has - they've got a diesel-driven fire pump on their iron loop, which is fairly traditional.

They have four 50-percent fire pumps that don't feed - that both can feed the iron loop, but also can provide flow through what they call their trained-alpha and trained-bravo safety headers which are usually provided - and I'll expect the TVA to correct me on all my misstatements, but which are usually provided by the raw cooling water system that provides he pressure for the fire main.

So, there's two ways that fire water can get into - well, there's two or three ways that fire water can get from the electrical fire pumps, which are the primary pumps. They can go through a safety header. It's all in - safety header alpha, it's all interconnected, safety header bravo is all interconnected, or they can enter the iron loop from there as well.

So, when I talk about the safety header, it's the raw cooling water system that is really the - I don't want to use the word "primary," but it's the main way that fire water gets from the - or it's the

least restricted path from the pump house to the plant sprinkler systems within the aux building.

Within the turbine building, it's actually the iron loop which provides that.

MEMBER STETKAR: Okay, thanks.

MR. STERCHI: This is John Sterchi of Watts Bar. And first off, the sprinkler systems that protect safety-related equipment are pre-action systems. So, they're not normally wet. So, flushing is not a great idea.

MEMBER STETKAR: Okay.

MR. STERCHI: We also have a - once a year we go through and make sure those systems are dry and we check for any kind of corrosion issues that come along. We open the auxiliary drains throughout the system and check issues there.

And the system that you talked about where the wet pipe system apparently is normally closed, that is for our vital battery boards and vital battery rooms.

MEMBER STETKAR: That's the only place?

MR. STERCHI: Those are the only places we have those manuals, those four vital battery rooms.

The fifth vital battery is actually a pre-action system also.

MEMBER STETKAR: Yes.

MR. STERCHI: Yes, sir. So, those - but they do have detection and they're right there beside the control room so they can get immediate response and we flush up to the normally wet pipe which is open to the system that supplies those four systems.

MEMBER STETKAR: Okay. And then your experience is that even downstream of that isolation valve as long as it is - that stagnant water as long as it's oxygen starved, won't give you a problem.

MR. FRUMKIN: Yeah. And what we've - I believe we just issued a generic communication information notice on partially filled water piping that receives much more corrosion than either stagnant or fully drained.

So, they're consistent with operating experience by doing it in this manner.

MEMBER STETKAR: Thanks. I was just curious, because I, as you said, it might be more unique than any other unique one, but there seem to be a number of items that I came across.

Thanks. That helps a lot.

MR. MOULTON: All right. Next one. Next one is manual actions.

MR. FRUMKIN: Did you talk about the last line, the fire protection summary table?

MR. MOULTON: Yes.

MR. FRUMKIN: Okay. I just - I'm very - I just wanted to say that from a review standpoint, that table is very helpful. And then as part of our review, it was enhanced and will be simplified I think in the future staff inspections and understanding of the program at Watts Bar.

So, operator manual actions at Watts Bar 2, I kind of broke this down into four different types of operator manual actions.

The first was operator manual actions that required fire area reentry. And we applied the Unit 1 criteria to the Unit 2. It was the same criteria and it seemed like a reasonable approach.

Then there's a second kind of category of important safety operator manual actions. And in accordance with our current guidance in Reg Guide 1.189 Rev 2, licensees have the ability to implement operator manual actions without prior NRC approval if it meets certain criterias, specifically defense in depth, feasibility and reliability.

So, the fire protection safety evaluation doesn't include an exhaustive discussion of those important safety OMAs. It's more of a high-level criteria analysis. And that's where the ten minutes

with 100 percent margin comes in as those important safety OMAs.

The NRC review of required for safe shutdown OMAs is a rigorous review by the staff of the operator manual actions that if there were a pre-`79 plant required to meet Appendix R, we would require exemptions.

So, the NRC did a review of all of these operator manual actions and we did a review for each manual action as it occurred in each - as it was required for a fire in each fire area.

So, if a manual action was going to be - was the same manual action for four different areas, there was an area description of each one of those areas that would need the manual action.

Does that make sense? Okay. So, it's a very significant addition to the safety evaluation - I'm sorry - for the fire protection report and very auditable.

And then there were certain operator manual actions in areas that didn't have, in the staff's opinion, the credible fire scenarios. And those areas actually did not have detection either.

So, the staff challenged the licensee - or, I'm sorry, the applicant to reexamine those areas. And

we ended up approving an evaluation for no manual actions in those areas.

And generally the staff if a manual action is for a very unlikely fire scenario, it just will fill up the procedures and perhaps complicate shutdown if there's manual actions for something that's unlikely to occur.

MEMBER SKILLMAN: Can you give an example of an area without credible fire, please?

MR. FRUMKIN: So, that's the example of the accumulator room. The accumulator room has a cable through it and I'm not exactly sure what the cable was, that was a safe shutdown cable.

So, if there were a fire in the accumulator room which there's no access to the accumulator room during operations, there's no moving equipment in the accumulator room, there may be some cables or some very low-power panels, and there's no detection, no suppression and there's nothing particular in the accumulator room that would cause a plant trip.

So, that - TVA had submitted manual actions for that room to say, well, if we have a fire and it damages the safe shutdown cable, we can do A, B and C. And they - we said, well, you're not going to know that there's a fire in there. There's no detection in there.

All you're going to start getting is plant responses and you're going to have to respond to that.

And they were able to come in with a credible evaluation and say, well, we don't need a manual action in this room because of the various criteria that I mentioned. And, therefore, there's no need for the manual action and it's sufficiently safe.

MEMBER SKILLMAN: Thank you.

MEMBER STETKAR: Dan, I'm still - were you here this morning?

MR. FRUMKIN: Yes, I was.

MEMBER STETKAR: Okay.

MR. FRUMKIN: And I -

MEMBER STETKAR: So, you heard the rant about the timing stuff. You said that you evaluated the operator manual actions on a location by location basis so that a fire in a particular location although fires in several locations may use a particular nominal OMA.

MR. FRUMKIN: Correct.

MEMBER STETKAR: Like OMA, picking on Rob here, 1495. There are several.

MR. FRUMKIN: Right.

MEMBER STETKAR: When you did those evaluations, did you do the evaluation in the context of the whole fire scenario?

My example where I stumbled across this is a single operator going from the control room to the aux building, two separate motor control center locations in the aux building and closing, you know, energizing and closing two valves to accomplish the required function.

Now, those two actions, close Valve A, close Valve B, are identified as two OMAs. They have two distinct numbers.

And yet when you look at TVA's staffing analysis for every fire scenario, one, and only one person performs both of those.

And the functional requirements are that both of those actions must be performed for success, because they close two parallel isolation valves. Closing one alone doesn't make it.

And yet, the timing analyses indicate depending on a particular fire scenario, that a particular OMA can be performed in, and I don't have the notes here, anywhere from three minutes to four minutes.

MR. FRUMKIN: Right.

MEMBER STETKAR: And yet, the requirement is that both of those OMAs must be completed and they must be completed by the same person, because that's

the staffing analysis.

And I'm curious how the staff reviewed that integrated kind of scenario perspective especially from the perspective of time T-0 is when the reactor trips and now I send anywhere from one to eight operators scurrying out in the plant to do all of these things.

And some of them are parallel and some of them actually are series. They - you need to energize the motor control center before - from one source before you can energize the motor contactor before you can close that valve, for example.

MR. FRUMKIN: Well, just to start with where manual actions fall into defense in depth, because it's - what we've done or what we're able to do at Watts Bar Unit 2 is for the vast majority of manual actions that are credited, the areas have full smoke detection which is a very reliable and robust way of identifying that a fire is in an area.

And then most of the areas actually have a pre-action sprinkler system which is a very effective sprinkler system.

And a lot of these areas are very large areas such that whatever the redundant train is that has to be damaged, it may not be close by.

What I - one of the important things to think

about with manual actions and the safe shutdown fires, is the fire that occurs isn't what's requiring the manual action.

Typically there's going to be another thing that happens in the plant, another cable that's damaged or another component that's affected.

Because if the fire consumes a cabinet, then that cabinet is just your single failure criteria and you would really have never left your emergency operating procedures.

So, you're actually having some sort of fire progression that would cause enough damage such that the manual action would be needed.

Now, once we get to the manual action, and I think the language that we use is in the unlikely event that a fire occurs, it isn't suppressed by either the - or isn't identified in time to be suppressed by the brigade and isn't suppressed in time by the installed suppression system. In that unlikely event, now we get to a manual action.

And then what happens in the manual action state is for your series example, is that operator would go from the control room to that first location. And the timing analysis is three minutes or so. And then another three minutes to the next location to do those

operations.

And almost in every case there's another 40 minutes, at least, for the operator to go back and double-check or triple-check or so forth.

TVA applied, you see many times, 500 percent time margin. That - the staff didn't really think that that was a very meaningful figure. Because if you could do the action in ten seconds, 500 percent time margin would be 60 seconds. And, quite honestly, that doesn't provide a significant amount of reliability.

So, the staff in this case chose 40 minutes of time margin in any case. Whether it's a two-minute manual action or 30-minute manual action, there's an additional 40 minutes where based on the walkdowns the operator is done. They did everything whether it was in series or each one of the operators. They're done and now they have 40 minutes before the plant is now in that - in a state where it's not being controlled.

MEMBER STETKAR: Thank you. I'll now read some information from both the fire protection report and the SER.

In particular, in fire protection report Part 7 Section 8.3.49.6 where it's discussing OMA 1495 and OMA 1496, this is a quote from the fire protection report: A fire in Room 772.0-AI5 west could damage cables

to PVA 28F or PVE 240F which could prevent the ability to operate the A motor-driven auxiliary feedwater pump outlet pressure control valve 2PCV3122A. The fire safe shutdown requirement for a fire in 772.0-A15 - I'm sorry. I read it wrong the first time - A15 west is to control discharge pressure on motor-driven - well, by transferring from normal to auxiliary control and operating the PCV from the auxiliary control room. Discharge pressure on the motor-driven pump must be controlled within 20 minutes. So, that's not 40 minutes.

MR. FRUMKIN: That's correct. And each one of the various -

MEMBER STETKAR: And in this particular timing analysis it's for the operator to go from the main control room to the transfer switch panel in the auxiliary building and transfer control for that particular valve from the main control room to the auxiliary control room, that's one OMA.

And the second OMA is then the operator goes from the transfer panel to the auxiliary control room and starts controlling the valve.

I'm assuming that he did talk to the guys and the people in the main control room, because they still have control over everything else. So, there's

probably some coordination there.

SER says demonstration of comparable actions resulted in a demonstrated time of less than four minutes. That's pretty quick.

MR. FRUMKIN: And if I hadn't seen it myself, I wouldn't have believed it.

MEMBER STETKAR: From the time that the reactor tripped.

MR. FRUMKIN: Yes.

MEMBER STETKAR: This is 20 minutes after the reactor tripped. That's your time available. And the time required is the people in the main control room give the instructions to the operator and he starts the process.

MR. FRUMKIN: So, there's two questions there. And the first - I'll do the - maybe the easy one first. Assuming that you have a smoke detection and people start accumulating in the control and they're in the control room by the time the reactor trips.

So, now it's just handing out - the aux operators are already in the control room. So, you hand them the sheet.

Now, what I mean by I wouldn't believe it if I didn't see it is you walk out of the control room, you're in the aux building. I've never seen that

before.

MEMBER STETKAR: Okay.

MR. FRUMKIN: The second door on your left depending on which exit you used, is the aux shutdown room.

Then you're actually at the aux shutdown room and, you know, we're talking a hundred yards. This is very short distances. Two steps I think there were and you're in the aux shutdown room. The next door over is the transfer switch room. It's right there. It's accessible.

And then they step back out of that room into the alternate shutdown - I want to call it alternate shutdown room because it just is - it's a very robust shutdown panel.

But they go to that panel. There's radio - there is a headset at that panel. There is the full control engages right there. And we really challenge them with the conversations and we weren't convinced until we went to the site to see that four minutes is a very credible - is a very credible time from leaving the control room to getting and getting to that point.

MEMBER STETKAR: We've spent two minutes according to my clock, just discussing how easy it is to do this.

And I'll grant you that it's easy if all you know you have to do is when I hit the pushbutton on the stopwatch, is to do everything you just described.

Experience from real-world fires is that that's not the way the world works. There's a lot of confusion in the beginning. There's a lot of coordination especially if I have to coordinate anywhere from six to eight operators. And you might not get that direction to go out and do that for some number of minutes.

Now, I'm not saying it's going to be 30 minutes. But because you're making a conclusion based on time margins here, you're concluding that that four minutes compared to 20 minutes gives me substantial margin.

If instead of having 16 minutes of margin, I had eight minutes of margin, would you draw the same conclusion?

MR. FRUMKIN: Well, in this case, anything -

MEMBER STETKAR: That's being less than - I did that purposely so I had less than a hundred percent.

MR. FRUMKIN: Right. Well, in, I mean, in this case anything over the walkdown times is margin. But I -

MEMBER STETKAR: That's four more minutes though.

MR. FRUMKIN; I -

MEMBER STETKAR: I'm not talking about 30 more minutes. I said four minutes to eight minutes - I'm sorry - four minutes to 12 minutes by getting the eight more minutes billing time.

MR. FRUMKIN: And so, just, I mean, I can just pull out 1852 which is where our expert panel looked at time margins.

MEMBER STETKAR: Right.

MR. FRUMKIN: And they were considering things which the point - one of the more difficult concepts for time margin is the diagnosis time.

MEMBER STETKAR: Right.

MR. FRUMKIN: Which in this case, there would not be diagnosis time because when they press that button, now they're into this procedure.

Now, there may be diagnosis time before pressing that button, but the assumption that the plant has put forward is that while the op plant is operating it is in a safe and stable place and time zero is when they flush out the reactor.

And then what the panel said numerous times in Appendix B of 1852, they're talking about time margins

typically eight minutes, 13 minutes. One person comes up with a 25-minute time margin, but the average is much below that.

There's statements in here saying the panel ultimately agreed that an influence factor of two is appropriate. So, that would take us to 12 minutes in accordance with our currently available review guidance.

So, in a case where there's 18 minutes, it exceeds our currently available review guidance.

MEMBER STETKAR: I understand that 18 minutes exceeds it. I'm challenging the notion that the actual time required is really four minutes in any kind of real fire scenario and how strongly did you challenge TVA to justify that.

MR. FRUMKIN: I walked it down.

MEMBER STETKAR: You walked it down because you knew where you needed to go and you knew when to start the clock.

In a real fire, the fire alarm goes off.

MR. FRUMKIN: Right.

MEMBER STETKAR: Maybe, you know, your presumption of the fact that smoke detectors and automatic suppression give you time margin before the plant trips is not necessarily supported by fires in

the real world.

Sometimes the fire causes a plant trip. Everything happens at T-0, not necessarily for every location in the plant, but oftentimes that does happen so that this notion of T-0 is just an arbitrary point in time at which point everybody is already assembled and has all of the information that they need and are just waiting for somebody to punch out the reactor to start the stopwatch is not necessarily supported by real fires in the real world.

When you're talking about if there's thermohydraulic justification for a fairly short time, let's say, 20 minutes, in that ballpark, the uncertainties, the variability on these times can be very important in terms of developing confidence in how much margin you'll really have.

I'm not arguing about five to ten minutes when you have, you know, an hour to do something. But on some of these scenarios where if, indeed, the available time is on the order of 20 minutes or so and you're making judgments based on directed time motion studies that conclude that this can be done in two minutes, or three minutes or four minutes from an arbitrary time T-0, I'm just trying to probe, you know, how skeptical you've been of these claims for very short

response times and supportive - the one that really got me, actually, was I wanted to probe the auxiliary control room because there are - or auxiliary - whatever it's called - control room.

The one that really drew my attention, and, in fact, these actions are invoked for a number of fire scenarios. Why? I don't know, but it's isolating the bid. And that's the one that has OMA 1444 and 1445 where a single operator goes to two motor control center rooms and must energize the valve and close the valve.

And the time window for that is also 18 minutes and both actions must be completed within 18 minutes.

The SER concludes demonstration of comparable actions resulted in a demonstrated time of less than two minutes. This provides approximately 16 minutes of margin for these actions.

So, somebody can go from the main control room and energize both of these vales, one person, energize both of the valves, get both of the valves closed in two minutes.

MR. FRUMKIN: So, when I said that an operator leaves the control room and it's the second door on their left is the aux control room, the first door on your left is this room; is that correct?

MEMBER STETKAR: No, there's two rooms. Two separate rooms, not just - see, that's - my whole point is are you evaluating each OMA in a - as a single number?

OMA 1445 is for the operator to go to that room and close that valve, where OMA 1445 - if I misspoke myself, 1444 is Valve A, 1445 is Valve B.

Whereas in the staffing requirements, the same person - in a sense, both of those OMAs are a single OMA, because there's no scenario that requires a single valve to be closed individually and the staffing analysis for every fire location lists one operator for closing both of those valves.

So, the fact that I designate them as OMA 1444 and OMA 1445 is an artifice. It's a single action, really, under a scenario where one person must go and sequentially close both of those valves.

And, in fact, there's another action where in addition to that there's a third OMA. Another operator actually has to, I guess, swap power supplies somehow to reenergize the particular motor control center where the first operator is waiting to get power back before he can energize the valve and close it. That's a different OMA number.

And I'm sure that if you timed that operator going to close the circuit breakers to reenergize the

motor control center, it also would have a short time, but all three must be done sequentially.

MR. FRUMKIN: But there's -

MEMBER STETKAR: And it's hard for me to believe that a total elapse time is three minutes or two minutes.

MR. FRUMKIN: And that's, I mean, that's the nature of these is that the total elapse time in that idealized circumstance is two, three, four minutes. It is. And I've been there and I've seen it.

And then we put in a time margin. How much time margin? Time margin that's consistent with our guidance.

And that's convincing enough for the staff to have reasonable assurance that these are credible actions.

MEMBER STETKAR: Okay, thank you.

CHAIRMAN RAY: All right.

MEMBER STETKAR: For the record, I'm not convinced.

CHAIRMAN RAY: Okay.

MR. MOULTON: Next slide is manual actions.

MEMBER SKILLMAN: Let me just pull the thread a little bit further. I'm also skeptical, and here's why.

I've been involved - I've never been involved in a plant trip because of a fire, but I've been involved in a number of plant trips at a 2700 megawatt plant.

And what I know is from the thud of the rods dropping until I get the main steam safety valve that opens or an atmospheric pump valve that opens or some other event in the plant that is just screaming for attention, that the reactor operators and the auxiliary operators are almost instantly focused on whatever that event is principally in the secondary plant. The primary plant normally takes care of itself.

If I assume that my plant trip is initiated by a fire, at least the sampling of one person who's been around a couple of major fires, I would offer that a different mentality takes over.

Those who have been near a big fire behave differently than those who are around the plant just tripped, because fire has a way of attracting attention in a way, at least in my mind, few other events attract attention.

And I've been involved in a fire for seven hours. And at the end of seven hours, that was a fire that went from about 1900 to midnight, those who were involved would have said, six or eight minutes just

passed, because of time compression in your mind.

And so, I think what John's after, this issue of time is very real. When you say three or four or six minutes, well, in an ideal situation where you have your fire response team already assembled and ready to trot, I think you can probably make those times.

But if those people have to show up as a consequence of the trip, it could take them six or eight minutes to get to the control room and then they're deployed.

And so, I believe this is an area that is very fruitful further discussion because for those plants that have had a number of trips, I think the people know that it takes a few minutes to assemble the responders to the plant trip.

And if fire is the initiator for the plant trip, you actually have two different scenarios unraveling.

One, is supporting the plant in its tripped state which requires an awful lot of people, and then you have this issue of fighting the fire or taking your immediate actions, your OMAs, that are intended to protect the station from the fire.

And so, I think that the idea of six or eight minutes or three or four minutes in an ideal world is

probably okay.

But in a real fire-initiated plant trip, I got to think that there is a different set of rules that apply. I honestly do.

So, I'm with John. I've got that same skepticism.

MR. FRUMKIN: Well, I won't try to answer your question now, because I don't think you're looking for an answer right now, but I will clarify I think it's even more complicated than what you're laying out, because there's really three different activities going on and it is very challenging.

One activity is the control room responding to the plant trip.

MEMBER SKILLMAN: The event.

MR. FRUMKIN: The event. But there's also the operator manual actions operators who are going out responding to the event outside of the control room. So, they have to communicate to the control room as well.

And then there's the third piece which is the fire brigade response.

MEMBER SKILLMAN: Bingo.

MR. FRUMKIN: Now, what we've - what TVA has done is they've assured that those operators going

out into the plant will, because of the locations of the fire, won't be impacted by - directly by the fire activities, but that's a third group of people is that fire brigade response.

One advantage I think TVA has that some other plants don't have is they have the five-person fire brigade plus a qualified advisor.

So, somebody who can provide a lot more context to the fire event to the control room as an operator is - has a lot of value, but just there's really those three kinds of things that are going on.

And we recognize that that's significant and challenging, but our guidance right now is this is how we treat it and I think we've treated TVA consistent with our guidance.

MEMBER STETKAR: I know that we've had quite a bit of discussions with the staff. I was trying to desperately look for references here and I can't find them regarding this particular issue of time available, time margin - time available response time and time margin.

And the uncertainties inherent actually in both of those calculations, there's uncertainties in that 20 minutes or 18 minutes or whatever the number is.

And there are uncertainties as what I've been trying to probe in the actual response time due to a variety of considerations.

And I can't - I can't quote the references, because I can't find them right off the top of my head here and I can't remember whether it's in regulatory guidance or not.

I don't know if Alex remembers, but there are statements in current either NUREGs or reg guides or the combination, which say that, indeed, uncertainties should be evaluated and that the staff will pay more attention to those uncertainties in cases where the margins between the available time and the time required are small. In other words, the smaller the margin, the more attention you'll pay to the uncertainties.

And that if you don't have those uncertainties, you don't really have much confidence in what that margin might be, which is why I'm not - I'm not addressing, you know, a five to ten to 15-minute response time for something that has, you know, an available time of 90 minutes.

That's not the issue, but uncertainties within a few minutes versus an available time of a few more minutes could be important.

And I think that is part of current regulatory guidance. I just can't put my finger on which particular - there are too many reg guides out there and we've had numerous discussions regarding this issue over the last year or so in particular with regard to fire analysis.

MR. KLEIN: John, this is Alex Klein, since you invoked my name.

MEMBER STETKAR: Yes.

(Laughter.)

MR. KLEIN: Dan mentioned the NUREG.

MEMBER STETKAR: 1852 is reliability and feasibility.

MR. KLEIN: Right. And as I recall, a number of years ago when we went through the proposed rulemaking, what, six, eight years ago now, something of that order, what you're thinking of might be somewhere in the statements of consideration.

Now, don't hold me to it, but I believe that we may have spoken about uncertainty and a surrogate on how to address uncertainty might have been something like - and, again, don't hold me to this, might be something like the time margin.

MEMBER STETKAR: That is in 1852. That concept does exist in NUREG 1852.

MR. KLEIN: And I think 1852 came as a result of that proposed rulemaking that was eventually withdrawn, as you'll recall.

MEMBER STETKAR: Yes.

MR. KLEIN: We didn't have many public meetings. We had several discussions, Steve, with ACRS. Had benefit of your feedback on it and, like I said, eventually developed NUREG-1852 as a result of that proposed rulemaking.

That's the only place I can think of offhand sitting here right now thinking about how we addressed uncertainty.

MEMBER STETKAR: As I said, I wasn't quite sure what direction this discussion was going to go. And I have to apologize. because I can't quickly find - I'm doing, you know, realtime searches on documents here.

And I know we've discussed it in this particular context and I know that there are words in - I thought it was regulatory guidance, but I can't quote the number, because I can't find it. So, I'll just leave it there for now so we can keep on schedule.

But the notion - the notion is that as the margins get smaller, the uncertainties can be more important and that the staff would essentially pay more

attention to the uncertainties in those conditions.

And if by the end of the afternoon I could find a reference, I'll get it for you.

CHAIRMAN RAY: Okay. Anything more? Let's finish up on -

MR. FRUMKIN: So, TVA, the applicant, Unit 2, is, in a way, the NRC's lead plant for evaluating multiple spurious evaluations because they were the - they are the only plant that submitted an analysis for review.

They did their analysis in accordance with the current NRC guidance, which is Reg Guide 1.189, and NEI-00-01, which 1.189 endorses.

I think you discussed it this morning about using the expert panels from Watts Bar 1 and Sequoyah. And you heard a lot about their computerized safe shutdown analysis report, but we did a review of the multiple spurious operations and it appeared to be consistent with our guidance.

And we're actually very pleased to have a copy of the report to - on the docket so that we can have some consistency with other plants who are doing similar analyses.

MR. MOULTON: Okay. Then our last slide is - this is just a listing of the implementation items

from the SE.

The first one is to complete the OMA feasibility walkdowns for Unit 2. The second one is to complete the scenario resolution actions for MSO scenarios which only affect Unit 2.

The third one is to complete electrical coordination modifications for Unit 2. And then finally, TVA has confirmed that the as-built fire protection report aligns with the as-designed fire protection report they had submitted. And if there are any gaps, to submit these gaps to the NRC for approval.

And this is the end of the presentation.

CHAIRMAN RAY: Okay. That last step, that's going to be, or is, required. I'm trying to understand the status of the fire protection report. It's reflected in the FSAR, right?

Is this some special requirement, I guess, is what I'm asking.

MR. MOULTON: This is a requirement to align what they actually create with what they've told us that they're going to create, but also allow us to have the fire protection review completed in advance of the licensing -

CHAIRMAN RAY: Okay.

MR. MOULTON: - action.

CHAIRMAN RAY: All right. Other plants aren't - don't have that last milestone there.

MR. MOULTON: Right. Most other plants had fire protection programs approved after they were licensed.

CHAIRMAN RAY: Is that going to be the case then - will this be the case for a plant's - I'm trying to think how it works into the COL process.

MR. MOULTON: I'm not sure about the COL.

CHAIRMAN RAY: Part 52. Seems like there's a degree of detail - approval of detail here that is almost unique to this circumstance.

MR. MOULTON: Well, it certainly is with the Commission direction where everything for Unit 1 is okay. Basically, automatically there's a lot of detail in there already. Some of which -

CHAIRMAN RAY: Yeah, I know, but I'm just trying to figure out what the parallel is here, or is this just an absolute one-off event?

MR. CROUCH: This is Bill Crouch. This is really not that much different than Watts Bar Unit 1 in that for Unit 1 we got the fire protection report reviewed and approved just before licensing, which is the same thing we will do here.

And so, this final submittal we will make

that will come into the NRC is our confirmation of anything that changes between now and time of licensing be confirmed that the information we submitted as-designed is what's really reflected in the as-constructed.

You would not expect a significant amount of change to come in from that. We typically implement just what we design, but there may be some small changes that we'll have to submit.

CHAIRMAN RAY: All right. But then as time goes forward, how is it? Is it required to be conformed every time you make any change whatsoever? Is 50.59 applied to it, for example?

It doesn't, I know, but what -

MR. CROUCH: When you say time goes forward, do you mean from the time we submit the as-constructed until -

CHAIRMAN RAY: No, as the plant is operating and you make changes to the -

MR. CROUCH: Oh, after you do that, then you do it in accordance with your license condition just like Unit 1 does. It's done under the license condition 2.foxtrot. I don't know what number it would be for Unit 2, but the generic letter 8610 process.

CHAIRMAN RAY: And is it you advise changes

they've made, or do you have to get approval every time they -

MR. CROUCH: It's similar like a 50.59 where you review it and the licensee -

CHAIRMAN RAY: It's similar to, but not identical to 50.59.

MR. CROUCH: That's correct.

MR. FRUMKIN: That's correct. The language that's typically used, just from memory, is you can make changes to your approved fire protection program as long as it doesn't adversely affect the ability to safely - achieve and maintain safe shutdown.

CHAIRMAN RAY: And then you have to document those changes periodically.

MR. FRUMKIN: Correct. And then in the fire protection report, the deviations and evaluations-type things that are in there are the kinds of things that depending on whether they - if they meet that threshold, they can add future evaluations without prior NRC approval and then they would be subject to inspection.

CHAIRMAN RAY: Okay. I'm just not familiar with - it seems parallel to, like I say, 50.50 design changes, but not the same.

MR. FRUMKIN: That's right. And the - since the fire protection report isn't in its entirety part

of the UFSAR, it's - although there is a fire protection section in the UFSAR, I don't think that the - and this is consistent with most other licensees that the changes to the fire protection report and evaluations will not get submitted periodically as part - to headquarters as part of the FSAR.

But these things do get picked up as, I think, part of our inspection procedures, what new evaluations have you done. And our inspectors go out and take a look at that and headquarters is available to be involved in those reviews.

MR. CROUCH: Let me correct that. This is Bill Crouch. The fire protection report is referenced in Part 9.5 of the FSAR. And when we send in our periodic update, you know, which is six months after your reference unit refueling outage, we do send an update to the FSAR and an update to the fire protection report at the same time.

They're two separate documents, but they're sent in at the same time.

CHAIRMAN RAY: All right. Well, it's something I'm not - wasn't familiar with that detail. It's just the last point here on the slide caused me to want to ask a few more questions.

All right. Anything else on fire

protection? By some strange quirk of fate we continue to be on time.

(Laughter.)

CHAIRMAN RAY: So, with that -

MR. SHUKLA: We have only two slides left.

CHAIRMAN RAY: Well, you're trying to get me, Girija, to say we're not going to take a break. Is that your point?

MR. SHUKLA: After Justin, we can take the final break.

CHAIRMAN RAY: Well, the problem is we're going to have another meeting after that, okay, and we could just go on and not have a break.

So, why don't we take a break on time, and then we can do all the other stuff that we want to do when we resume at 3:15.

(Whereupon, the proceedings went off the record at 2:57 p.m., and went back on the record at 3:4 p.m.)

CHAIRMAN RAY: We'll finish up, adjourn the meeting and then hold a planning session as soon as we're done.

So, you have a conclusion to give.

MR. POOLE: Yes, I do. So, as I mentioned before, the staff is nearing completion of the - staff

review is nearing the completion of the project for - TVA mentioned a percentage of 99 complete. That's a roughly good number.

As I talked before, it's essentially the open items that are left. The major one being the hydrology review.

So, the future milestones are - will be another SER documenting the closure of those open items.

CHAIRMAN RAY: Well, there's some 20 items, I think, if I remember correctly.

MR. POOLE: Correct. So, we would have to close those 20 items in the next SER. Obviously, further down the line is the - that would lead to issuance of the OL. And in conjunction with that is completion of the ACRS review, the ASLB review.

TVA mentioned we do have a hearing that will occur roughly in the early 2014 time frame based on the FES being - or supplement 2 to the FES being published this month.

And then the region doing all their inspection activities to certify the plant has been built in accordance with the licensing basis that we have reviewed.

So, again, our plan was to just talk about expectations for the next meeting.

CHAIRMAN RAY: Well, we can do that when this meeting concludes here.

MR. POOLE: Okay.

CHAIRMAN RAY: That will be kind of rambling and open-ended, probably. But as far as today's meeting goes, anything further?

MR. POOLE: No, the staff has nothing further.

CHAIRMAN RAY: All right. Let me do as we normally do and let's try and focus on today's subject matter still for another minute or so and see what input each of the members present would like to make.

John.

MEMBER STETKAR: I just want to reiterate I'm still looking for references. NUREG-1921 addresses this notion of time required and time available and uncertainties.

According to someone next door, I think we've written on that topic related to defense in depth for faults and digital instrumentation control systems. Those are all interim staff guidance.

I am - it's fairly evident I'm concerned about the conclusions regarding the margins for operator manual actions that had been assessed in the fire protection report and confidence that indeed adequate

margins available accounting for the realities of the fire scenario at each location and uncertainties in the estimation of the response times.

CHAIRMAN RAY: This is probably the only chance we have to look in that kind of detail at a plant like this.

MEMBER STETKAR: That's correct. I mean, you know, we're involved to a greater or lesser extent on the NFPA 805 transition analyses and we're kind of familiar with what's being done there. But those being risk-informed, you actually have human reliability analyses and account for the uncertainties.

And this is the, as you said, the only opportunity that we've had to look at an Appendix R-type fire protection program developed under Reg Guide 1.189 at this stage of the evaluation.

We've sort of touched upon it in some of the license renewal issues, the plants that have Appendix R, but at a fairly high level - a very high level only looking at the deltas, you know, if they made changes to the plant, for example.

So, yeah, you're right, this is - which is why I got interested in it, because it's kind of the first one that I've seen at this level of detail.

And that's, you know, is a kind of closing

remark, basically, all I have to say.

CHAIRMAN RAY: All right. Well, it's possible that because this is a one chance we have to look at something, I mean, we're not - your concerns are generic in terms of their implications, not limited just to Watts Bar 2. And for that reason, we ought to keep track of it and see if there's something that ultimately makes its way into the Committee's conclusions.

MEMBER STETKAR: And as you've mentioned, Harold, it may be, I mean, this is - I brought it up in the context of Watts Bar 2 simply because that's the subject at hand and I happen to have their fire protection report and the SER related to that fire protection report.

CHAIRMAN RAY: Right.

MEMBER STETKAR: The topic obviously would apply generically to any, you know, Appendix R-type plant if -

CHAIRMAN RAY: Well, the back and forth basically was - we're doing what the staff guidance says and your comments in response to that was, yeah, but I don't - I'm not persuaded that's the right thing.

So, okay. Again, we should track it from that point of view, decide what the next step is.

Anything else?

MEMBER STETKAR: Nothing.

CHAIRMAN RAY: Mike.

MEMBER RYAN: Nothing, except to thank the applicant and the staff for their briefings and exchange. They were very informative. Thank you all very much.

CHAIRMAN RAY: Dick.

MEMBER SKILLMAN: Yes, I have four comments. First of all, high marks on the subject of shared systems or once idle systems from Unit 2 that are now being brought into service.

The discussion about reconciliation, chain of custody, code, code protection just give the applicant high marks for that activity.

I recognize it's governed by ASME that there's a right way to do it and a not right way to do it. It sounds like you're really on the right track.

The second item, after receipt of the SAFE database is an item that I think deserves attention ensuring that that SAFE database is thoroughly accurate, because it is a key piece of your fire protection program.

The third item is the information shared by Mr. Haag from Region II relative to commercial grade

dedication.

My experience is that the commercial grade dedication arena is one where latent defects can be deeply buried in the plant. And those only show up a year later or five years later, and the reason is because the critical characteristics may not have been thoroughly understood.

And so, if there has been a pattern of findings in that commercial grade dedication area, which I kind of heard Mr. Haag talk about, I would say heads up. Let's take a real close look at that, because that is a - that's a potential trap. It really is Appendix B criterion 3 and it can be a B.

And the last item is this extended discussion that we had late in the last meeting about the assumptions for the OMAs and the time that are allocated.

CHAIRMAN RAY: And that's the same -

MEMBER SKILLMAN: And that's John's item that I - first of all, thank you very much for an excellent day of presentations, and high marks for several of these, and cautions for several more.

CHAIRMAN RAY: Okay. And for my - thank you. From my end, it's simply that as I observed at the beginning, this is one in a long, long series of

subcommittee meetings, but one that we are committed to produce an interim report following that would reflect not just on this meeting, but on the review that's occurred to date.

And we'll be talking soon, that is, right after this meeting and then further on later in the week, with members about how to produce that interim report in terms of the interest that they might have and material to be presented at the full committee meeting.

So, that will all be forthcoming. And with that, unless there's - well, I do need on the record to invite comments from members of the public. I perceive there are none here in the room.

Is the phone line open, Girija?

MR. SHUKLA: NO, it's not. It's on mute.

CHAIRMAN RAY: Well, it was open earlier. That's why I ask. So, could you open it and I'll ask the required question about public comment?

(Pause in the proceedings.)

CHAIRMAN RAY: It's open now? Okay. I understand the phone line is open so that anyone who has been participating by listening in on that line is now free to make any comment that they wish to. If there's any such person, please speak up.

(Pause in the proceedings.)

CHAIRMAN RAY: Hearing nothing then, we will conclude there is no one wishing to make comments at this public meeting and we'll bring it then to a conclusion.

(Whereupon, the meeting in the above-entitled matter was adjourned at 3:25 o'clock p.m.)

Watts Bar Nuclear Plant – Unit 2

Presentation to

Advisory Committee on Reactor Safeguards

June 4, 2013


Opening Remarks

Raymond Hruby, General Manager, Technical Services

Agenda

Opening Remarks	Raymond Hruby *General Manager, Technical Services*	**2**
Agenda		**3**
Construction Completion Status Update	Raymond Hruby *General Manager, Technical Services*	**4**
Boron Dilution	Robert Bryan *Senior Licensing Engineer*	**15**
Site Interface	Robert Bryan *Senior Licensing Engineer*	**18**
Fire Protection Program	William Crouch *Mechanical Engineering Manager*	**22**
Closing Remarks	Raymond Hruby *General Manager, Technical Services*	**36**
Questions		**37**

Construction Completion Status Update

Raymond Hruby, General Manager, Technical Services

Watts Bar Unit 2 Estimate to Complete

- TVA Board authorized completion of the Watts Bar 2 Project in accordance with the revised Estimate to Complete (ETC) on April 26, 2012
- The ETC developed a range for project completion between September 2014 and June 2016
  - Probable completion date December 2015
  - A construction permit extension request was submitted on May 17, 2012
- Project leadership has confidence in the revised ETC
- Though several project risks and opportunities remain, they are manageable

WBN Unit 2 Construction - Summary

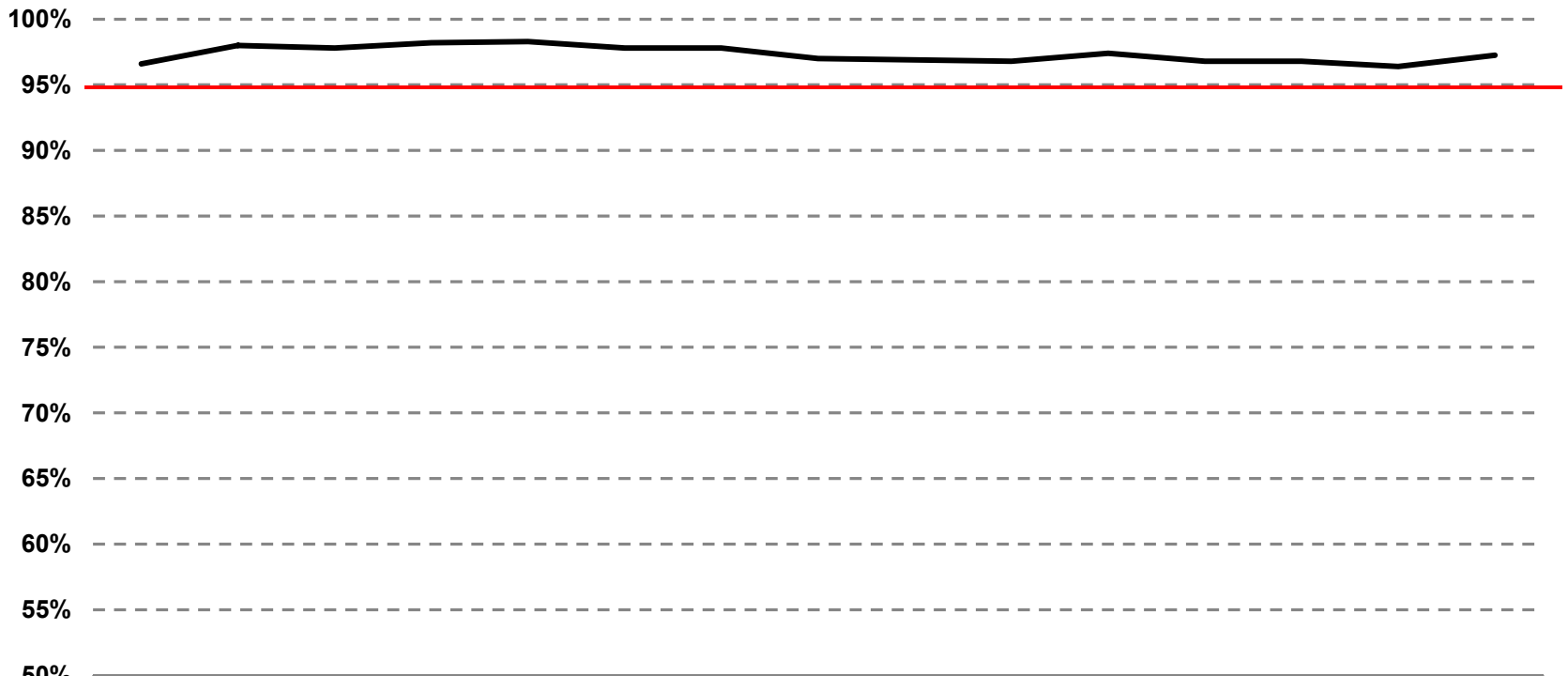
- Summary
  - Project Completion Activities are Tracking Consistent with the ETC
  - Safety
    - 20 Million Man-Hours without Lost Time Incident
    - Fiscal Year to Date Recordable Injury Rate (RIR) 0.19
    - Safety Conscience Work Environment
  - Quality
    - Project Quality >97%
  - Cost & Schedule
    - Cost and Schedule Adherence are Meeting Expectations

WBN Unit 2 Construction - Summary

- Accomplishments
  - Transitioning from Bulk Construction to System Turnover for Start-up Testing
  - Released 1st System to Testing since Revised Estimate to Complete (ETC)
  - Stamped 1st ASME System (Service Air)

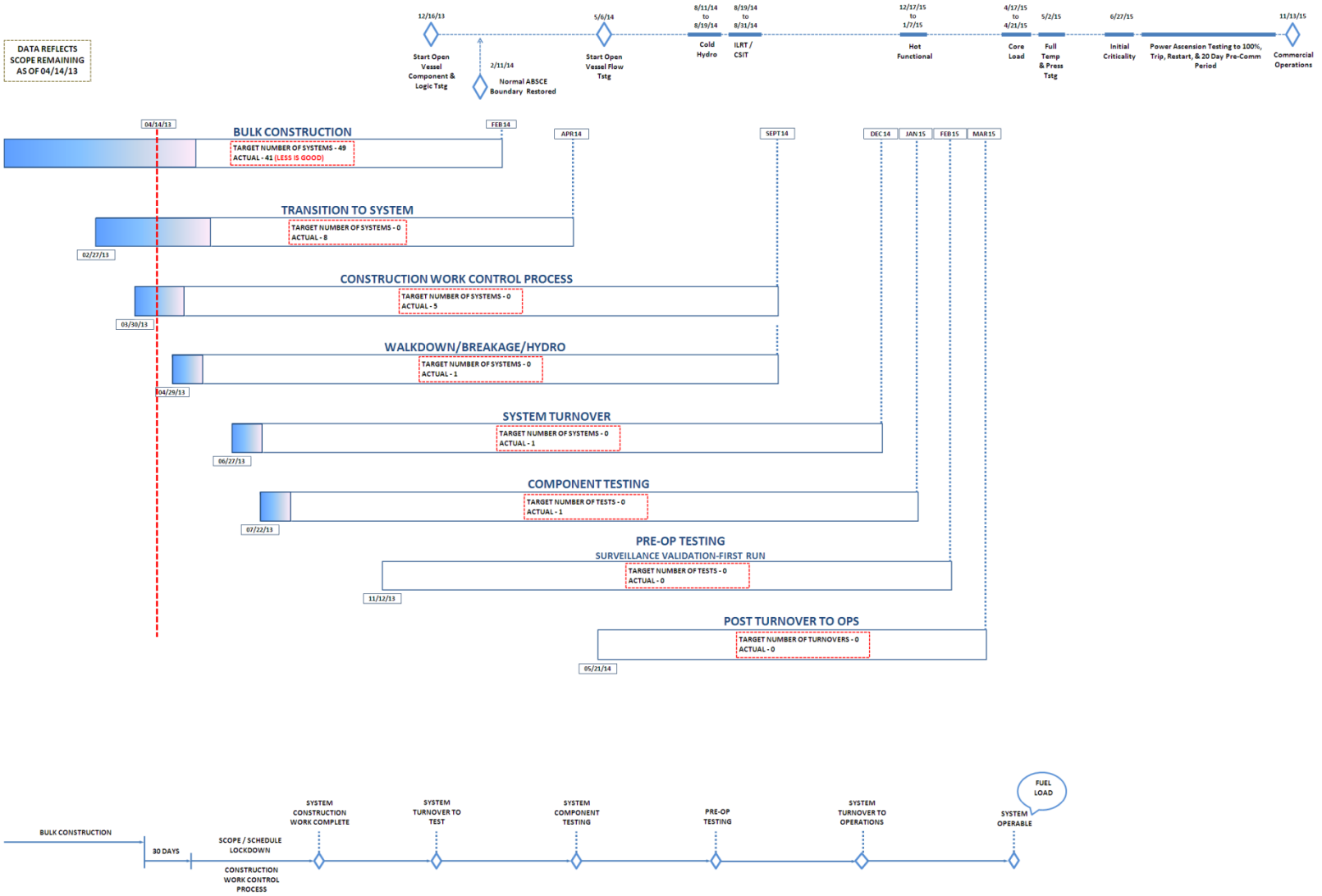
WBN Unit 2 Construction – Project Quality

Overall Acceptance Rate (%) of QC Inspections
February 2012 through April 2013



	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Total	96.6%	98.0%	97.8%	98.2%	98.3%	97.8%	97.8%	97.0%	96.9%	96.8%	97.4%	96.8%	96.8%	96.4%	97.3%

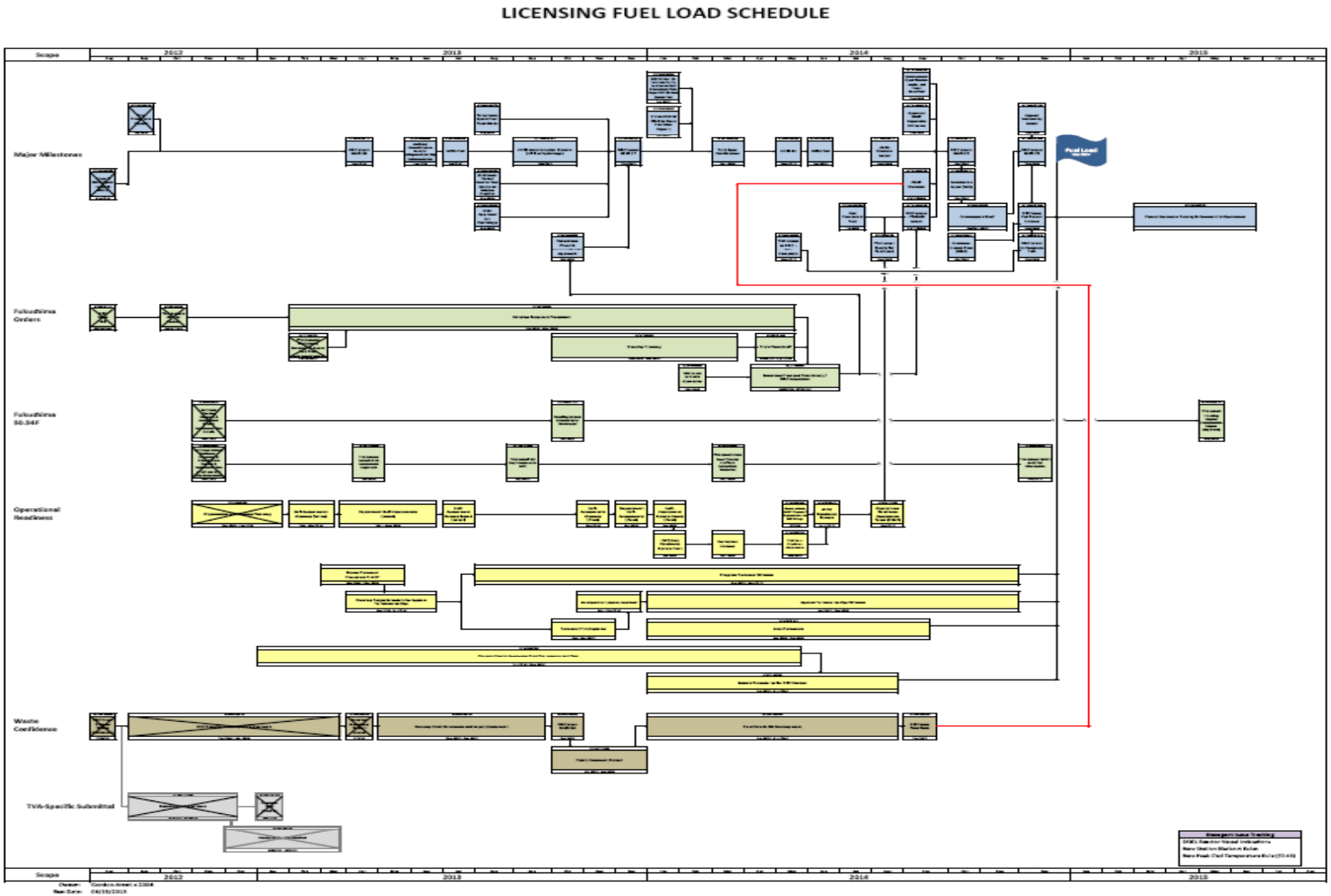
WBN Unit 2 Construction – Completion Status



Licensing Path Forward

- Schedule to Completion
  - Safety Evaluation Report (SER) – 99% Complete
    - Supplemental SER Open Items
  - Final Environmental Statement – June 2013
  - Closure of Regulatory Commitments
  - Regional Inspections
  - ASLB Hearing – Commence January – February 2014

Licensing Path Forward



Licensing Path Forward

- Risk Areas
  - Waste Confidence (Spent Fuel Storage)
  - Fukushima
  - Hydrology
  - Aquatic Contention (Health of Ecosystem)
  - Emergent Regulation

Dual Unit Operation – Readiness Team

- Ensure WBN's transition from safe, reliable single unit operation to safe, reliable dual-unit operation
  - Ensure operational excellence achieved in transition of WBN2 from Nuclear Construction (NC) to Nuclear Power Group (NPG) and other deliverables conducted in quality manner to ensure safe, reliable dual unit operations
  - Minimize, control, document, and effectively train on any WBN1 – WBN2 operational differences
  - Successfully support INPO Readiness Review and NRC Operational Readiness Assessment Team (ORAT) inspections
  - Safely conduct initial fuel load and operational testing necessary to achieve dual-unit commercial operations

Dual Unit Operation – Transition Status

- Dual Unit Operations:
  - Department specific transition plans completed
  - Implementing transition plan actions
  - Site and corporate transition plans in development (June 2013)
  - Performing current round of self assessments (July 2013)

- Major Inspections (inspection dates tentative):
  - Test strategy and plan complete
  - TVA plant readiness assessment (January 2014)
  - INPO readiness review (May 2014)
  - NRC operational readiness assessment (July 2014)

Boron Dilution

Robert Bryan, Senior Licensing Engineer

Chapter 15 Transient Analysis

- SER Open Item 132 – Boron Dilution Modes 3, 4, 5
  - Analysis “in progress” at last ACRS meeting – now completed with acceptable results
  - FSAR 15.2.4 Uncontrolled boron dilution
    - Mass addition event previously evaluated for Modes 1, 2, and 6
  - Identification
    - High flux at shutdown alarm at 1.3 x background
    - High charging flow 158 gpm
    - Added Volume Control Tank (VCT) high level Alarm at 63%

Chapter 15 Transient Analysis

- Procedure Changes
  - VCT high level alarm response
  - Limit to one primary water pump at Mode 4 and below
  - Isolate potential dilution paths prior to removing last RCP from operation

- Results
  - Analysis demonstrates sufficient time between detection and criticality for operator action (>15 minutes required)
    - Time Available
      - Mode 3 > 45 minutes
      - Mode 4 > 45 minutes
      - Mode 5 > 23 minutes

Site Interface

Robert Bryan, Senior Licensing Engineer

WBN Site Interface

- Noteworthy Changes
  - Flood Level
  - Updated Meteorology
  - Tritiated Water Storage Tank

- Unit 1/Unit 2 Regulatory Interface
  - Integrated Licensing Project Plan
  - Agreed to Priority
  - Regular Meetings

WBN Site Interface

- Physical Differences
  - Goal – Minimize Physical Differences/Maximize Unit Fidelity
  - No Tritium Production
  - Original Steam Generators
  - No Feedwater Flow Uncertainty Recovery

WBN Site Interface

- Physical Differences (continued)
  - Equipment Replacement
    - Inadequate Core Cooling Monitor – Common Q
    - Core Flux Monitoring – Wincise
    - Digital Upgrades
  - Cyber Security
  - ECCS Sump Modification
    - Prohibited Fiber Installation
    - ECCS Throttle Valves Replaced

Fire Protection Program

William Crouch, Mechanical Engineering Manager

Unit 1 Fire Protection Report (FPR) History

- WBN's Fire Protection Program and Fire Hazards Analysis – Initially Submitted on April 18, 1977
- Superseded by the WBN Fire Protection Report (FPR) – Revision 0 Submitted to NRC February 5, 1992
- Addressed Single Unit Operation
- NRC's Review Principally Documented in Appendix FF, "Safety Evaluation: Watts Bar Nuclear Plant Fire Protection Program," SSER 18 (October 1995) and SSER 19 (November 1995)
- WBN Unit 1 was Licensed to Revision 5 of the FPR dated November 1, 1995
- FPR Later Updated (Revisions 6 thru 39) Consistent with Unit 1 Standard License Condition 2.F (Generic Letter 86-10)

Dual Unit Fire Protection Report

- Principal Commitments for the Dual Unit Fire Protection Report (FPR) and the Licensing of Unit 2:
  - Submittal of the As-Designed FPR
    - Original Version Submittal August 2010
    - Eight Sets of Requests for Additional Information (RAIs)
      - Provide Additional Information/Clarification
      - Address Technical/Administrative Errors
      - Address Historical Technical/Administrative Errors
    - Final Version Submitted March 2013
  - Submittal of the As-Constructed FPR (October 2014)

Dual Unit Fire Protection Report Process

- Objective
  - Expand Existing Report to Address Dual Unit Operation
  - Maintain Consistency with Unit 1 Commitments
  - Incorporate Planned Unit 1 Upgrades
- Starting Point - Existing Fire Protection Report (Revision 39)
- Incorporate Unit 2 Specific Equipment/Cables
  - Classic Fire Protection (Detection, Suppression, Separation, Emergency Lighting, etc)
  - Fire Safe Shutdown (Equipment/Cables, Functions, Locations, etc)
- Incorporate Upgrades
  - Multiple Spurious Operations
  - Operator Manual Action Reductions
  - Feasibility and Reliability Evaluation of Unit 2 & Common Operator Manual Actions

Classic Fire Protection Features

- Dual Unit Program Features in Place Prior to Unit 1 Operation
  - Fire Operations/Fire Brigade
  - Equipment Surveillance Programs
  - Combustible Control/Ignition Source Control/Impairment Control Programs

- For Dual Unit Operation, Most Required Equipment Installed Prior to Unit 1 Operation
  - Detectors
  - Sprinklers/Hose Stations/Hydrants/CO_2
  - Raceway Protection/Fire Dampers/Penetration Seals/Water Curtains
  - Emergency Lighting
  - Communications

- Unit 2 Additional Equipment
  - Reactor Building Annulus Detectors/Sprinklers
  - Fire Dampers
  - Emergency Lights
  - Penetration Seals
  - Reactor Coolant Pump Spray Shields
  - Reactor Coolant Pump Oil Collection System

WBN Appendix R Compliance

- Appendix R Sections
  - III.G - Fire Protection of Safe Shutdown Capability
  - III.J - Emergency Lighting
  - III.L - Alternative and Dedicated Shutdown Capability
  - III.O - Oil Collection System for Reactor Coolant Pump
- Not Implementing NFPA 805

Fire Safe Shutdown

- Tools and Inputs
  - SAFE - Proprietary Interactive Database
  - Plant Divided Into Fire Areas/Analysis Volumes
  - Equipment/Cable Data Based on Unit 1/Common As-Constructed and Unit 2 As-Designed Information
  - Review of Combustible Loading, Compartmentation, Detection, Suppression, Deviations and Evaluations

Fire Safe Shutdown (continued)

- Analysis Process
  - Appendix R Functions Required to Achieve Safe Shutdown
    - Reactivity Control
    - Reactor Coolant Makeup
    - Reactor Coolant Pressure Control
    - Residual Heat Removal
    - Process Monitoring
    - Support Functions
  - Analysis Identifies Potentially Affected and Credited Power Systems and Equipment

Fire Safe Shutdown (continued)

- Analysis Results
  - Verify Functions Satisfied
  - Identify Mitigating Actions (as required)
    - Separation/Protection of Equipment and Cables
    - Alternate Equipment
    - Cold Shutdown Repairs
    - Main Control Room Operator Manual Actions
    - Local Operator Manual Actions

Summary of Compliance Table Excerpt

PART I – INTRODUCTION TABLE I-1 SUMMARY COMPLIANCE FIRE PROTECTION									
Room Number and Name	**Safe Shutdown Equipment or Cables Y/N**	**Automatic Detection Y/N, Full/Partial**	**Automatic Suppression Y/N, Full/Partial**	**Fire Rated Wraps**	**Combustible Load, Fire Severity**	**Deviation Number in Part VII**	**Evaluation Number in Part VII**	**CSD Repairs req'd in any room due to fire in room**	**III.G Compliance for HSD**
FIRE AREA 15-2:									
737.0-A12 – Unit 2 Heat and Vent Equipment Room	Yes	Yes, Full	Yes, Full	1 hour	< 25 minutes	2.4	3.4, 8.3.18 & 65		2c, 1-G, 2-G

Dual Unit Appendix R Modifications

- Restore Unit 2 Capabilities
- Address Dual Unit Equipment Capacity Issues
- Address Unit 2 Safe Shutdown Equipment Requirements

Multiple Spurious Operations

- Multiple Spurious Operations/Multiple Concurrent Hot Shorts in Accordance with Regulatory Guide1.189 Revision 2 and NEI-00-01 Revision 2
- PWR Owners Group Generic List of MSO Scenarios – 54 Scenarios
- Expert Panel Review Methodology (NEI-00-01)
- Single/Dual Unit Operation Considerations
- Modifications/Actions to Address MSO Scenarios

Feasibility and Reliability Evaluations

- NUREG 1852 and Regulatory Guide 1.189, Revision 2
- Fire Prevention, Detection, and Extinguishment
- Feasibility - Adequate Time Available to Perform Actions
- Reliability - Adequate Time Available to Ensure Reliability
- Local Equipment Functionality/Available Indications
- Accessibility (Environmental Factors, Communications, Personnel Protection Equipment)
- Portable Equipment
- Procedures and Training
- Staffing Requirements

Remaining Actions

- Procedure and Equipment Validation Walkdowns
- Issue and Train on Operations' Fire Safe Shutdown Procedures
- Submit Unit 1 Amendment Request for License (Condition 2.F) to make New Report Applicable
- Submit As-Constructed Dual Unit Fire Protection Report

Closing Remarks

Raymond Hruby, General Manager, Technical Services

Questions

ACRS Subcommittee Meeting Regarding

Watts Bar Nuclear Plant Unit 2

Status of Licensing and Inspection

Docket No. 50-391

June 4, 2013

Office of Nuclear Reactor Regulation (NRR) – Justin Poole

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Agenda Topics

- **TVA**
  - Construction Completion Status
  - Closure of Open Item 132 – Boron Dilution (FSAR 15)
  - Fire Protection Report - (FSAR 9.5.1, by reference)
- **NRC**
  - Status of Licensing and Construction Inspection
  - Status of Open Items
  - Supplement 26 to SER
  - Remaining Safety Review Activities

Region II Presentation of Status of Construction Inspection Activities

Region II – Robert Haag

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Inspection Program Results

- Completed 2012 End-of-Cycle review. Overall acceptable performance noted.
- Eleven Non-cited Violations issued in 2012
- Three (3) Apparent Violations associated with Commercial Grade Dedication
- Follow-up inspections of Confirmatory Order actions associated with records falsification
- Inspection of the Corrective Action Program
  - Annual PI&R inspections
  - Focus Samples
  - Mixed Results

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Inspection Resources

- RII expended 12,488 staff hours in 2012 compared to 16,350 hours in 2011
- Adjusted regional and resident inspection resources to better match TVA's construction activities
- Reduced WB2 construction resident inspectors to three
- In addition to the resident inspectors, 32 inspectors performed inspections in 2012
- Four (4) positions in RII (team leader and project inspectors) assigned to the WB2 inspection project
- Challenge: Replacement of construction SRI

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Status of Inspection Activities

- Closed 299 of the 541 construction inspection items in the Inspection Planning and Scheduling (IP&S)
- Majority of open IP&S items have been inspected
- Identifying specific attributes that require inspection and scheduling those inspections
- Limited success in using TVA's construction schedule to schedule NRC inspections
- Allegations continue to be a significant workload

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Pre-Operational Testing Inspections

- Team leader focusing on planning for pre-operational testing inspections
- Two major sections: Testing and Operational Preparedness Inspections
- Lead inspectors assigned to mandatory tests (six) and primal test (nine) inspections

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Pre-Operational Testing Inspections

- Possibility that six pre-op testing inspections will take place near the end of 2013
- Operational Preparedness inspections (radiation protection; chemistry; security; fire protection, etc.) RII proposing reduced scope
- Developing strategy to staff construction and pre-op testing inspection in parallel

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Conclusions

- Construction inspections are continuing – identified issues are pursued to ensure adequate corrective action
- Commercial Grade Dedication inspection results forthcoming
- Identifying scope of remaining IP&S items and planning inspections is crucial
- RII has adequate inspection resources

NRR Presentation of Status of Licensing Activities

NRR – Justin Poole

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Status of Operating License Application

- TVA amendments to FSAR received (A92 to A109)
- Supplements to original Safety Evaluation Report
  - SSER 21 - identifies regulatory framework
  - SSER 22 – FSAR Chapters 2, 3, 5, 6, 8, 9, 10, 13, 14, 17
  - SSER 23 – FSAR Chapters 4, 7
  - SSER 24 – FSAR Chapters 2.4, 11, 12, 13.6.6, 15
  - SSER 25 – FSAR Chapters 15.4
  - SSER 26 – Fire Protection Report Review
- Review Areas Remaining
  - Closure of open items from SER review, includes flooding (FSAR Chapter 2.4)

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Status of Open Items

- Total Open Items – 128 (some numbers never used)
- Open Items closed as of SSER 26 – 75
- Of the 53 that remain open
  - Items requiring NRC *confirmation* (e.g., updating FSAR): 33
  - Items requiring additional NRC *evaluation* (e.g., additional information required from TVA to complete staff review): 20

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Consistency between Units 1 and 2

- Project Managers (PMs) under the same Branch Chief
  - Designated as the backup for each other
- Both PMs attend planning and status meetings for each plant
  - Ensures reviews are done consistently
  - Constant communication and flow of information
- Licensing basis for Unit 1 will “freeze” this fall
  - No new amendments
- Licensing basis changes currently being reviewed for Unit 1 are a result from Unit 2 review

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Safety Evaluation Report Supplements (SSERs)

- SSER 26 Published May 2013
  - Closure of Open Item 132 – Boron Dilution analysis
  - Fire Protection Report review (FSAR Section 9.5.1 and Appendix FF)

Section 15: Transient and Accident Analyses – Closure of Open Item 132 – Boron Dilution

NRR – Christopher Jackson

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Open Item 132 - Boron Dilution in Modes 3, 4, and 5

- RG1.70, Revs 0 and 1, required explicit Boron Dilution calculations in Modes 1, 2 and 6. Subsequent revisions RG 1.70 added requirements to consider in all 6 modes
- SRP 15.4.6 calls for analysis of event in all modes
- Analyses inconsistent with SRP since only Modes 1, 2, and 6 analyzed
- Open Item for TVA to provide analyses of boron dilution event that meet the criteria of SRP Section 15.4.6, including
  - Description of the methods and procedures used by the operators to identify the dilution path(s) and terminate the dilution in order to determine analyses comply with GDC 10
  - Time available for manual action begins at start of event

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Open Item 132 - Boron Dilution in Modes 3, 4, and 5

- TVA provided analysis for all modes
- Results of the analysis show for all modes, the results meet the 15 min acceptance criterion for manual actions to occur prior to shutdown margin being lost
  - Mode 1 - >15 or 33 mins (with and without rod control)
  - Mode 2 – 26 mins
  - Mode 3 – 46 mins
  - Mode 4 - 46 mins
  - Mode 5 - 23 mins
  - Mode 6 - N/A (cannot occur due to admin controls)

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Open Item 132 - Boron Dilution in Modes 3, 4, and 5

- For Modes 3, 4, and 5, NRC staff assumed a higher charging flow rate (conservative)
- Results for this scenario still meet the 15 min acceptance criterion for manual actions to occur prior to shutdown margin being lost
  - Mode 3 – 31 mins
  - Mode 4 - 31 mins
  - Mode 5 - 15 mins
- NRC staff has closed Open Item 132

Section 9.5.1 and Appendix FF:

Fire Protection

NRR – Charles Moulton and
Daniel Frumkin

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Section 9.5.1 Fire Protection

- Agenda Topics
  - NRC Staff Review Guidance
  - Differences from the 1995 Supplemental Safety Evaluation (SSER)
  - Topics Requiring Significant Interaction
  - Operator Manual Actions
  - Multiple Spurious Operations
  - Implementation Items

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NRC Staff Review Guidance

- SRM-SECY-07-0096
- NUREG-0847, 1995 SSER's 18 and 19
- Appendix A to Branch Technical Position (BTP) APCSB 9.5-1, 1977
- Regulatory Guide (RG) 1.189, Revision 2, 2009

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Differences from the 1995 SSER

- Enhanced or New Review Topics
  - Operator Manual Actions (OMAs)
  - Multiple Spurious Operations (MSOs)
- Reduced Level of Detail in SE
  - Electrical Raceway Fire Barriers
  - Fire Barrier Penetration Seals

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Topics Requiring Significant Interaction

- Fire Water System Design (FWS)
- Internal Pipe Corrosion in the FWS
- Fire Protection Report Summary Table I-1

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Operator Manual Actions

- Reviewed OMAs Requiring Fire Area Reentry
- TVA Review of Important to Safety OMAs
  - Defense-in-depth, feasibility and reliability
- NRC Review of Required for Safe Shutdown OMAs
- Removing OMAs in Areas without Credible Fires

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Multiple Spurious Operations

- TVA Evaluated MSOs in Accordance with Current NRC Guidance in RG 1.189, Revision 2
- TVA Utilized Input from Expert Panels at Watts Bar Unit 1 and Sequoyah
- Backed Up by Computerized Safe Shutdown Analysis [Part VI of TVA Fire Protection Report]

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Implementation Items

- Unit 2 OMA feasibility walkdowns
- MSO scenario resolution actions for scenarios which only affect Unit 2
- Complete electrical coordination modifications
- Confirm as-built FPR aligns with as-designed FPR.
  - Gaps to be submitted to the NRC for approval.

Project Summary of Watts Bar Unit 2 Remaining Activities

NRR – Justin Poole

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Project Status

- Staff review nearing completion
- Future Milestones
  - Complete SER and SFES-OL
  - Complete ACRS Review
  - Conduct hearing and ASLB provide decision
  - Operational readiness assessment
  - Certification of as-built construction

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Expectations for Next Meeting

- Tentatively – May/June 2014
- Closure of Open Items
  - Major piece being FSAR Chapter 2.4 Flooding